The Chemical Age

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The Raw Materials of Industry

AMONG the problems that most contribute to the disturbed state of the world, that of availability of raw materials ranks high. We in this country have seen this year some of the effects of possessing less raw materials than industry needs. The shortage of steel is due primarily to insufficient supplies of coke and iron ore. The coke supplies are entirely a matter within our own regulation; we have the coal; it is only necessary to build sufficient coke ovens. Iron ore is in a different category, for we possess few rich ores and the greater portion has had to be imported. Troubles in Spain have caused a shortage of supplies and it is proving by no means easy to make up this gap.

It is not alone the iron and steel industry that feels the pinch, but all industries that purchase plant constructed of ferrous metals. In other industries, too, the availability of raw materials has to be taken into account by a prudent directorate. It is sufficient, in this connection, to quote a passage from Sir Alexander Walker's address at the annual meeting of The Distillers Company, the italics being ours: "It is often disconcerting to forecast which of several new processes may prove to be the most economic, *having regard to the changes taking place in the raw material market*, and we may be compelled 'to back two or three for a place.' This has been the practice of some of the largest chemical companies on the Continent and in the United States, and there is no alternative if we are to hold our own place in industry."

The effect on nations of lack of raw materials can be well illustrated by what is happening in Japan. During the Russian-Japanese war, Japan, although having no supplies of cotton, wool or rubber, and possessing only a little coal and iron, and that of poor quality, was able to buy what she wanted from the rest of the world. The Great War and its aftermath showed that it was possible for a belligerent to have so large a proportion of the world against her that access to raw materials might become impossible. Consequently Japan is now seeking on the mainland the coal and iron that she does not possess, and the army's interest in ecomonic co-operation in North China is due to the recognition that in that region is the best iron ore in China and one of the richest coal-fields of the world. Japan, however, possesses no oil, and does not seem to be likely to come into possession legitimately of oil-bearing territory. The Japanese navy is casting envious eyes upon the Borneo oilfields, and as these are owned by a European Power, there is a possible source of international complication, or worse. It will be noted that it is the militarists that are worrying about raw materials in Japan; the industrialists have obtained in the open market the material they need, and their interest in the raw material problem is but lukewarm. The late war showed that military power is, under modern conditions, not measured by territory and population, but by a nation's industrial equipment and capacity, which involves secure access to certain essential raw materials —rendered doubly important by the modern League of Nations conception of "sanctions." It is not surprising that under pressure from the army and navy large schemes are being promoted for the production of oil from coal. Several Fisher-Tropsch installations are either in operation or in course of erection.

The circumstances just narrated make it uncertain whether much of the supposed industrial unrest in the world upon this raw material question is not due essentially to those of the higher councils of totalitarian states who are the unfortunate possessors of the Napoleonic or Alexandrian temperament. Industrialists will always in such states sing to the tune set by the leaders, for without the concurrence of those who have the temporal power, the business of the industrialist becomes impossible. Every state that has properly balanced finances can buy raw materials if it can pay for them.

Two sub-committees of the League of Nations have prepared draft interim reports, the first dealing with restrictions upon the production and export of raw materials, and the second with obstacles in the way of paying for them. Full information and final conclusions should shortly be available as the committee met again recently. This much, however, can be stated: France, the U.S.A. and Russia produce between them 66 per cent. of the world's iron ore: the U.S.A. and the U.K. produce 54 per cent. of the world's coal; the U.S.A., Russia and Venezuela produce 81 per cent. of the world's oil; the U.S.A., India and China 75 per cent. of the world's cotton; Chili, the U.S.A. and Canada 49 per cent. of the world's copper; and Malaya and the Dutch East Indies 83 per cent. of the world's rubber. Rubber alone is a colonial product, and can be purchased by all on equal terms; the rest are produced within the boundaries of sovereign states, and no conceivable redistribution of colonies could affect access.

Generally speaking, those countries that control raw materials to-day, are those who are the least likely to disturb the peace of the world. Free access would only be denied when the peace of the world was threatened. In this country, for example, one of our chief preocupations is that other countries do not now buy so much of our coal from us as they used to. There are certain areas, however, in which free trade is restricted and the suggestion has been made that a new international agreement should guarantee equal commercial access over a much wider area than at present.

Notes and Comments

The Nottingham Meeting

THE annual meeting of the British Association for the Advancement of Science, held this year in Nottingham, opened on Wednesday evening with the inaugural meeting at the Albert Hall, Derby Road, when Professor Sir Edward Poulton, F.R.S., president of the Association, delivered his presidential address. Sir Edward chose as the subject of his address the progress of thought in organic evolution as followed in addresses, papers and discussions at meetings of the Association. In actuality, the address was an interesting account of part of the history of the Association, as matters appertaining to geographical, geological, and biological evolution have always received special attention at these meetings. Such famous names as Huxley, Lister, Kelvin, Darwin, Ray Lankester, and MacBride, are among those whose work has been vital to the successful advancement of our knowledge in the many fields related to evolution. The President gave examples of the valuable contributions made by them to the Association's meetings, his address being leavened by amusing anecdotes concerning these leading scientists of recent times.

Of Public Interest?

THE proceedings of the Chemistry Section was started by a symposium on "Some Aspects of Chemotherapy" on Thursday morning. The presidential address given by Dr. F. L. Pyman, F.R.S., was on researches in chemotherapy, and among the other chemotherapeutic topics dealt with were: The chemotherapy of diseases due to bacterial infection, the experimental chemotherapy of malaria, and new derivatives of *p*-arsanitic acid which have interesting potentialities as new drugs. Here then is a presentation of the most recent advances made in a branch of science devoted mainly to the combating of disease and which is almost fundamental to the welfare of the community. As such, therefore, it should be of outstanding interest to the public and admirably fulfils one of the aims of the Association, namely, that of bringing the objects of science more before the public eye. The symposium on chemotherapy is not, however, included in the series of communications in which the more immediate public interest is stressed. But it would surely be just as easy to stress the public interest in a subject such as chemotherapy, to which it is so greatly indebted, as in X-ray methods, the upper atmosphere, industrial physics, diagnosis of colour defect, and other topics. To go further, it was found that the public interest in chemotherapy could not be satisfactorily stressed, there are many other branches of chemistry which could be so treated, for there is no other science which plays such an important part in the daily life of the general community.

Silicosis Prevention

APART from the human suffering and loss of life caused by silicosis, one of the most objectionable of industrial diseases, it has been responsible for severe financial loss occasioned by compensation of infected workers, loss of working time, etc. A thorough investigation of the problem of silicosis prevention has been carried out in America by the National Silicosis Conference, and a bulletin has recently been issued which summarises the conference's findings. While it is impossible at present to define a limiting standard of permissible dust concentration, it can be said generally that for lengthy exposure a concentration of more than 5,000,000 particles per cubic foot of a highly siliceous dust is dangerous. It is pointed out that the first step towards prevention of silicosis should be taken when a new plant is being built or an existing plant remodelled. In operations involving dusty materials, ledges and other resting places for the dust should be eliminated as far as possible and the building designed so that it can be readily washed down, brushed or vacuum cleaned. Such operations producing a great amount of dust should be isolated from the rest of the plant, and, if possible, dust-producing units should be grouped together in order that a more compact and efficient exhaust system may be installed.

Industrial Development

A SURVEY of industrial development in Great Britain prepared by the Board of Trade shows that during 1936, 551 new factories were opened and 201 fectories were extended; 386 factories were closed as against 485 in the previous year. Although the Greater London area is preferred by manufacturers, there is no evidence of a drift of industry to the south. There were fifteen new factories in the chemical trade, six factory extensions and eight factories closed. Of these latter four were on transfer to new factories in other areas, and one in consequence of centralisation of work at the firm's main plant. A feature of the survey is the growth in the number of "foreign" factories established; 140 such factories were opened in 1932, the year in which the Import Duties Act came into operation, and additions to this number have taken place in subsequent years. At the end of last year nearly 90 per cent. of the "foreign" factories established during the four previous years were still in operation, and the employment provided by these factories had increased by 75 per cent.

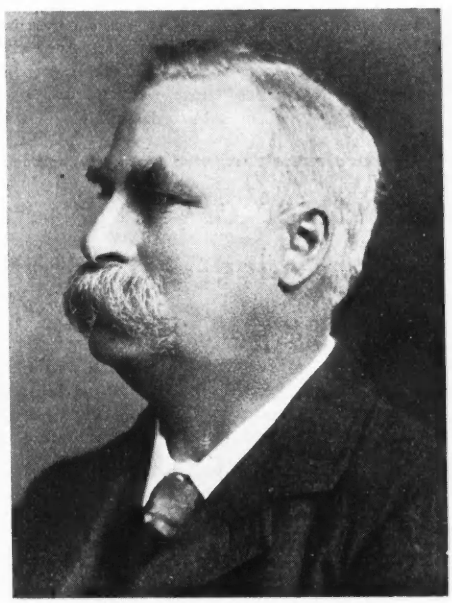
Lac Research

THE scientific investigation of the properties of lac, and how these may be modified by chemical and physical means in order to increase the sphere of usefulness of the product, has received stimulus from the progress which has been made in synthetic resins. It has been found that lac can be treated to yield materials which are largely unique and cannot, as yet, be wholly reproduced, or closely imitated, by purely synthetic substances. Some recent work, described in technical paper No. 12 issued by the London Shellac Research Bureau, is concerned with the modification of lac with fatty acids. Different products have been made with varying proportions of lac and various fatty acids, ranging from 30 per cent. to 70 per cent. of either component. It is stated that the lac fatty acid compounds may be useful as cements and for any purposes where ready emulsification in water is a desirable property. They are readily esterified to any desired acid value and the esterified products are suitable as paint and varnish media, and particularly in combination with nitrocellulose lacquers.

The British Association Meeting at Nottingham

Presidential Address by Sir Edward B. Poulton

THE history of revolutionary thought as recorded in meetings of the British Association was the subject which Professor Edward B. Poulton, D.Sc., LL.D., F.R.S., took for his presidential address to the British Association at Nottingham on Wednesday. In the selection of this subject he restricted himself mainly to the series of meetings which began with the Jubilee at York in 1881, the first of many that he had attended. This fiftieth anniversary meeting was a memorable one, with Sir John Lubbock (Lord Avebury) as president, and the chair of every section, except Economics, taken by a past-president of the Association. The event which stood out most clearly in Sir Edward's memories of this meeting was Huxley's evening lecture on "The Rise and Progress of Palæontology"—the science which provides an essential part of the foundation on which geographical, geological and biological evolutionary history has been built. One chief object which Huxley had before him was to bring forward a calm, clear statement of the evidence on which alone it was possible to achieve that "reconstruction of an extinct animal from a tooth or bone," which had made so deep an impression on the imagination.



Sir Edward B. Poulton, F.R.S.

Huxley's thoughts on the immensity of past geological and biological time lead to another controversy on the age of the earth conducted intermittently at meetings between 1892 and 1921. Lord Kelvin's estimate of a hundred million years as the period during which the earth had been cool enough to permit the existence of life upon its surface—a period reduced by Professor Tait to ten million—was a great difficulty to geologists and biologists who believed that an immensely longer time was required for the history of the fossiliferous rocks and the evolution of animals and plants. At Oxford in 1894, Lord Salisbury chaffed the believers in natural selection, telling them that he did not wonder that they required many hundred million years for so slow a process, but that "if the mathematicians are right, the biologists cannot have what they demand. . . . . The jelly-fish would have been dissipated in steam long before he had had a chance of displaying the advantageous variation which was to make him the ancestor of the human race." When Professor John Perry read this pronouncement, sweeping aside the firm convictions of biologists and geologists, he was led to re-examine the evidence and soon found a flaw. The heat of the earth had been calculated on the assumption of a conductivity uniform through the whole mass, but Perry showed that with a conductivity becoming higher with increasing depth the Kelvin-Tait estimate of the time required for cooling to the existing temperature—on which the age of the habitable earth had been based—must be immensely lengthened.

Lord Lister was president at Liverpool in 1896. He was one of the greatest benefactors of mankind and, with the utmost simplicity and modesty, told the story of his life's work and the success which, in spite of all opposition, had been achieved. To hear him was an enduring inspiration. The year 1896 was also the Jubilee of Lord Kelvin's wonderful half-century of achievement in research and teaching

The one line of evidence which left some anxiety in 1896, was suggested by Helmholtz who allowed the sun only eighteen million years to have been giving out radiant heat at the present rate—a period Lord Kelvin was willing to extend to 500 million—and this estimated maximum was also accepted by Sir George Darwin, who, in his address at Cape Town in 1905, spoke of the new evidence obtained by M. and Mme. Curie in their proof that radium gives out heat, and quoting in confirmation the work of R. J. Strutt, W. E. Wilson, and G. H. Darwin, finally concluded that the physical argument is not susceptible of a greater degree of certainty than that of the geologists, and the scale of geological time remains in great measure unknown. The light thrown by radium upon the Helmholtz estimate was also referred to in the presidential address of Ray Lankester at York in 1906, of J. J. Thomson, quoting the work of Strutt, Joly and Rutherford, at Winnipeg in 1909, and became a predominant subject in the Joint Discussion on the Age of the Earth, between Sections A, C, D and K, at Edinburgh in 1921. Lord Rayleigh, in opening this discussion, concluded that radioactive methods of estimation indicate a moderate multiple of 1,000 million years as the possible and probable duration of the earth's crust as suitable for the habitation of living beings."

Continuing his address, Sir Edward said: "I remember as a youth receiving a gentle parental warning against committing myself too entirely to a belief in evolution—a very different experience from that of our President at Hull in 1922, my friend Sir Charles Sherrington, who in 1873 was persuaded by his mother to take the *Origin* with him on his summer holiday, with the inspiring words—'It sets the door of the Universe ajar!'"

It must always be remembered that, apart from any theory of causes, the world owes its belief in organic evolution to all the great men whose researches and teaching have founded the two schools, and perhaps chiefly, at any rate among the English-speaking nations, to Herbert Spencer, whose infallibility certainly lent itself to such stories as that of his supposed reply to an argument—"That can't be true, for otherwise *First Principles* would have to be re-written—and the edition is stereotyped"; or how Darwin said that to read Spencer always made him feel like a worm, but that he retained the worm's privilege of wriggling.

At the last meeting of the British Association in Nottingham (1893) Canon Tristram was president of Section D and, in his address, gave an account of the observations during a visit of many months to the Algerian Sahara in 1857-58, when he "noticed the remarkable variations in different groups, according to elevation from the sea, and the difference of soil and vegetation."

The relationship between the germinal foundation of Mendelian and Weismannian heredity was considered in a paper by L. Doncaster read before Section D at the South African meeting in 1905. He then maintained that Weismann's "hypothesis that the material bearer of hereditary qualities is the chromatin of the nucleus" of the germ-cells had been confirmed by recent work on their maturation which "has

shown that they contain a mechanism which seems precisely adapted to bring about that segregation of characters which forms the most fundamental part of the Mendelian theory, and it seems hardly possible that the two things are unconnected."

MacBride, in his address to the same section at Newcastle in 1906, spoke of the "great epoch-making discovery of experimental embryology, *viz.*, the existence of specific organ-forming substances." These fundamental discoveries bring to mind a conversation with Weismann when he had been finally driven to frame and elaborate this hypothesis, and was so appalled by the number and minuteness of the material bearers of hereditary qualities contained in a single germ-cell that he could not believe that the physicists and chemists were correct in their conclusions about the size of the atom. He admitted that diverse lines of evidence led to the same result, but even so, he believed the future would prove that physicists were mistaken and that the atom was far smaller.

Towards the close of his address, Sir Edward briefly mentioned a few experiments brought before Section D at the Bristol meeting in 1898 beginning with the work of Weldon and Thompson on the common shore crab, showing that the effect of china clay and other impurities in the sea at Plymouth was selective and promoted changes of shape which ensured that the water flowing over the respiratory surface was more efficiently filtered.

Thoughts on the development of these hidden powers by the educating influence of social environment, suggest the greatest of the problems by which we are faced—the end of international war. Michael Foster, in his address at Dover in 1899, after speaking of progress in the material of warfare was led to believe that, "happily, the very greatness of the modern power of destruction is already becoming a bar to its use, and bids fair—may we hope before long?—wholly to put an end to it." In his concluding pages he expressed the hope that the brotherly meeting between the English and French Associations at Dover and Boulogne might be looked upon as a sign that science, by nobler means than the development of armaments, was steadily working towards the same great end.

The words of Sir Richard Owen, in his address to the twenty-eighth meeting at Leeds in 1859, also make a special appeal at a time when the British and American Associations are confidently hoping to strengthen still further the bonds of sympathy and mutual appreciation by which they have been happily united for so many years. Referring to the transatlantic telegraph, he said: "We may confidently hope that this and other applications of pure science will tend to abolish wars over the whole earth: so that men may come to look back upon the trial of battle between misunderstanding nations, as a sign of a past state of comparative barbarism."

New Laboratories of the Paris Gas Co.

Some Interesting Test Apparatus

THE new laboratories of the Paris Gas Co. serves not only for the control of the various raw materials bought and the materials sold, but also for research work in connection with coal and the by-products of gas manufacture.

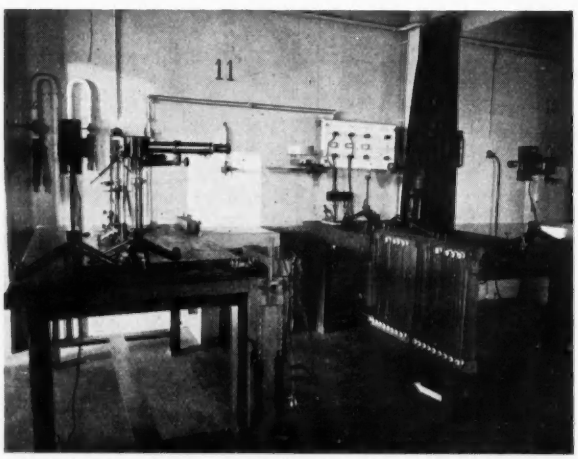
In each laboratory gas, water and compressed air are provided along the working tables. For studies of the gas, four different gas distributions are provided, one from each of the two main producing plants, a third from the water gas producer, and a fourth for the distribution of any particular gas of which studies may be needed and which is connected to the distribution. Four water distributions are also provided, city water, river water, well water and spring water being supplied. In the control laboratory tests are carried out as to the exact composition of the gas produced, coal is tested, and composition of by-product tar is determined.

Some of the apparatus used has been actually built in the laboratory. Apparatus used for testing the expansion of coal provides one instance. This apparatus consists of a small tube into which a volume of 1 cc. of finely powdered coal is placed. On the top of this coal a tiny weight connecting to an arm by means of a wire, is placed. The tube is then heated according to a regular schedule which is carefully watched, and the behaviour of the coal watched. At the beginning of the operation the coal will expand and the weight lifted. This causes a needle at the far end of the arm to which it is attached to mark the expansion on a revolving cylinder, the amount and speed of expansion under various speeds and degrees of heating being thus determined. This is important if the expansion of the coal in the gas retorts is not to break out the walls during treatment.

The coke produced by the plant is tested to determine its reaction to water and to CO_2. This is done by subjecting the coke to a stream of water vapour or of CO_2, and then analysing the gas after passage by means of a series of selective filters which remove the various possible impurities in the gas one after the other.

A very complete installation for determining the effects of various percentages of admixture of naphthalene with the gas is installed. The possibilities of the use of various types of cokes as active carbon is also being determined.

An interesting set of experiments on the value of various types of paints provides another interesting aspect of the investigations which are in progress. Ordinary aluminium dishes are used for this purpose, a dish being given an internal coating of the paint to be tested, care being taken to follow the manufacturer's instructions exactly, and when the paint has dried, being filled with a solution of dichloride of



A laboratory of the Paris Gas Co. devoted to the measurement of flame temperature.

mercury. If there is the slightest flaw in the paint surface, or if it cracks in the least, the dichloride attacks the aluminium and rapidly destroys the plate. The gas company chemists insist that the method is extremely severe and quite infallible.

The special laboratory set aside for the studies of coal tar is provided with equipment for determining the characteristics and behaviour of coal tar under all conditions. Among these is a machine which artificially ages the tar by ultra-violet light.

Researches in Chemotherapy

Abstract of Dr. F. L. Pyman's Presidential Address to the Chemistry Section

Dr. F. L. Pyman, F.R.S., President of the Chemistry Section of the British Association.

CHEMOTHERAPY may be regarded as the treatment of disease by chemical substances, which have been shown by biological methods to be relatively much more toxic to pathogenic organisms than to human or other animal hosts, said Dr. F. L. Pyman, F.R.S., in opening his presidential address to the Chemistry Section of the British Association on Thursday.

Chemotherapy was developed by Paul Ehrlich, and its most outstanding achievement has been the introduction of the arsenic group of spirochæticides. Very early on, Ehrlich noticed that when certain dyestuffs were injected into the living animal they selected certain tissues which were intensely stained, whilst others were left practically free from colour, and as long ago as 1891 he observed that the malarial parasite was strongly stained by methylene blue and thus differentiated from the tissue of the host. It then occurred to him that it might be possible to discover dyestuffs or other drugs whose chemical affinity for disease organisms was so great that the organism might be killed without damage to the tissues of the host. Successful results were obtained in the laboratory with dyes such as methylene blue, Trypan-red, and Trypan-blue, but practical value has been slight.

"Chemotherapeutic Index"

In the course of his studies Ehrlich soon found it necessary to find some means of expressing the chemotherapeutic activity of compounds for purposes of comparison. He therefore determined for each new substance the ratio of the minimum curative dose to the maximum tolerated dose, which he called the "chemotherapeutic index." The ideal compound would obviously be the one which would destroy the parasitic agents of disease without in any way injuring the cells of the body. Such a compound has yet to be discovered, for every known substance which is toxic to parasites is also toxic to a greater or lesser extent to body tissues. For practical purposes the chemotherapeutic index should be as favourable as possible.

Chemotherapeutic research postulates co-operation between clinicians, biologists and chemists. The first step is the discovery by the biologist in co-operation with the clinician that some parasite is responsible for a given disease. Then methods must be found by which the parasite can be isolated, cultivated and studied. Sometimes this can be done in the test-tube, as in the case of the researches on bactericides and amœbicides. In other cases the particular disease, or one closely related to it, may be induced and studied in animals.

Research on Bactericides

On the chemical side researches in chemotherapy start from the discovery that some drug, whose constitution is wholly or partly known, is of clinical benefit in a given disease or is toxic to certain organisms. Once some knowledge of the chemical constitution of the drug has been obtained, substances more or less closely related to it can be synthesised and tested for their chemotherapeutic properties. Traditional knowledge of the value of cinchona bark in malaria, followed by the isolation of quinine and the associated alkaloids, the recognition that the medicinal value of the bark was due to these, and the determination of their chemical constitutions, made possible the chemotherapeutic researches which led to the discovery of plasmoquin and atebrin.

The introduction of phenol or carbolic acid for the prevention of sepsis by Lister in 1867 formed the starting point in research on bactericides. A very large number of derivatives of phenol have since been made and tested for their bactericidal properties. The effect of substituting one or more alkyl groups in the benzene ring has been studied, and it has long been known that many alkyl-phenols exceed phenol itself in bactericidal value. One method of determining the phenol coefficient of bactericides is the Rideal Walker test, comparing their efficiency with that of phenol in destroying *B. typhosus*. By this test the cresols—methylphenols—have phenol coefficients of 2 to 2.5, whilst thymol—a methyl*iso*propylphenol—has a phenol coefficient of about 25.

In recent years systematic studies have been made of several homologous series of phenols. An early example of the investigation of a homologous series was made in another field by Morgenroth and his collaborators (1911-17). They studied the homologous series of alkylhydrocupreines, and showed that peak activity was obtained at the ethyl member (optoquin) for pneumococci, and at *iso*octyl (vuzin) for *B. diphtheriæ*. In clinical use optoquin proved to be unsatisfactory for the treatment of pneumonia, but vuzin was used in the treatment of wounds.

Substituted Resorcinols

American chemists demonstrated the profound effect of the length of the side chain upon the bactericidal properties of substituted resorcinols. Johnson and Lane (1921) showed that the phenol coefficients of 4-*n*-alkylresorcinols rose steadily in the series methyl, ethyl, propyl and butyl, whilst Dohme, Cox and Miller (1926), continuing the series, found a maximum at 4-*n*-hexylresorcinol, which had a phenol coefficient of 50, the values for *n*-amyl- and *n*-heptyl-resorcinol being 33 and 30 respectively. They also showed that the antiseptic value of the *n*-alkylresorcinols were greater than those of branched chain alkylresorcinols having the same number of carbon atoms.

Coulthard, Marshall and Pyman (1930) studied the variation of phenol coefficient with increase in the *n*-alkyl-side chain in the 4-*n*-alkylphenols, 4-*n*-alkylguaiacols and in four series of *n*-alkyl-cresols, of which the 4-*n*-alkyl-*m*-cresols are the most important. In all cases the maximum effect was shown where the side chain was a *n*-amyl group. The alkyl-cresols had higher phenol coefficients than alkylphenols containing the same alkyl group, whilst the alkylguaiacols were far less active. 4-*n*-amyl-*m*-cresol, which had a phenol coefficient of 280 against *B. typhosus*, proved to be highly bactericidal when tested against many other species of bacteria.

Pharmacological experiments having shown that 4-*n*-amyl-*m*-cresol had less than one-half of the toxicity of hexylresorcinol, and that it was non-toxic in medicinal doses, further work was carried out to determine its suitability for use in a mouth wash. In order to test its efficiency in this respect different dilutions of amyl-*m*-cresol, compared with plain water as a control, were added to 5 c.c. of a mouth washing. The mixture was shaken thoroughly, and the bacteria left

alive after 5 and 15 minutes were then estimated, with the following results:—

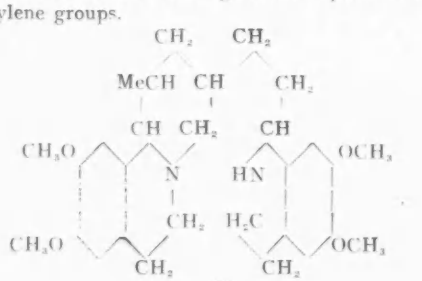
Tube	*Solution added*	*Colonies after 5 mins.*	*Colonies after 15 mins.*
1.	5 c.c. water	4,700	5,000
2.	5 c.c. 1:10,000 amyl-*m*-cresol	4	2
3.	5 c.c. 1:20,000 ,, ,, ,,	50	4
4.	5 c.c. 1:30,000 ,, ,, ,,	1,925	2,169

Research on amœbicides was greatly facilitated by the technique developed by Dobell and Laidlaw (1926), and Laidlaw, Dobell and Bishop (1928) for testing amœbicides *in vitro*. Emetine (I) has for long been the principal drug used in the treatment of amœbic dysentery, but it has some undesirable by-effects, amongst others a nauseating effect. In a search for substances having the amœbicidal action of emetine without its nauseating effect, a number of alkaloids very closely related to emetine in chemical structure were made at an earlier period. When tested by Dale and Dobell (1917), by an early laboratory method several of them, *O*-methylpsychotrine (a substance which differs from emetine structurally only in containing two hydrogen atoms fewer) and *N*-methylemetine, for instance, were found to be more toxic to *Entamœba histolytica* than emetine itself. Clinical trials of *O*-methylpsychotrine (Jepps and Meakins, 1917) and *N*-methylemetine, however (Low, 1915; Wenyon and O'Connor, 1917), showed them to be of little or no value in the treatment of amœbic dysentery.

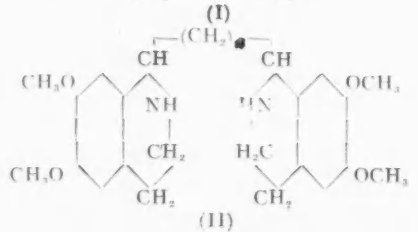
A Stereoisomeride of Emetine

The method of Dobell and Laidlaw, however, depending on the cultivation of amœbæ in a medium consisting partly of solid (inspissated fresh horse-serum) and partly of liquid (egg-white diluted with Ringer's fluid) with a little starch, gave results which fell into line with the clinical results. Emetine was found to be fifty times as toxic to amœbæ *in vitro* as *N*-methylemetine, *iso*emetine, and *O*-methylpsychotrine, which are clinically inactive. The clinical inactivity of *iso*emetine (Low, 1918), a stereoisomeride of emetine, is interesting and reminiscent of the difference between *d*- and *l*-stereoisomerides in the cases of adrenaline and hyoscyamine. Later, Laidlaw, Dobell and Bishop described a simpler medium, consisting of 1 part of sterile horse-serum, 8 parts of Ringer's fluid with a small quantity of sterile solid rice-starch, disodium hydrogen phosphate being added as a buffer. In this medium they found that the amœbæ were destroyed in four days by emetine 1 in 5,000,000, provided that the medium did not become too acid.

In 1927 Brindley and Pyman suggested a constitutional formula for emetine, and in 1929 Child and Pyman synthesised a series of compounds (II) having similar constitutional features in that they contained two 6:7-dimethoxytetrahydro-*iso*quinoline nuclei united through the 1:1′ positions by chains of methylene groups.

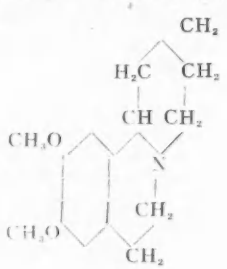


(I)

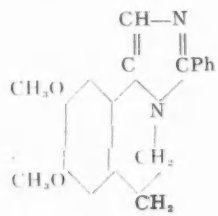


(II)

When tested by Mr. Tate and Miss Vincent, working under Professor Keilin's direction, at the Molteno Institute, at Cambridge, using the methods employed by Laidlaw, Dobell and Bishop, none of these substances prevented the growth of *Entamœba histolytica* in culture at a dilution of 1 in 500,000, whereas the control substance, emetine, was effective at a dilution of 1 in 500,000. The testing of a further series of *iso*quinoline derivatives, prepared by Child and Pyman (1931), was designed to find out whether the reduced benzpyridocoline ring (which is a feature of Brindley and Pyman's formula for emetine), or other systems in which the tertiary nitrogen atom of emetine is common to two rings conferred amœbicidal properties or not. This group of compounds, which included 10:11-dimethoxy-1:2:3:4:6:7-hexahydrobenzpyridocoline (III), proved to be but feebly active compared with emetine, for the most highly amœbicidal member of the series 9:10-dimethoxy-3-phenyl-5:6-dihydrobenzglyoxalocoline (IV) only prevented the growth of *Entamœba histolytica* in cultures at a dilution of 1 in 25,000, whereas the control substance, emetine, was effective in a dilution of 1 in 500,000.



(III)

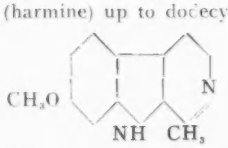


(IV)

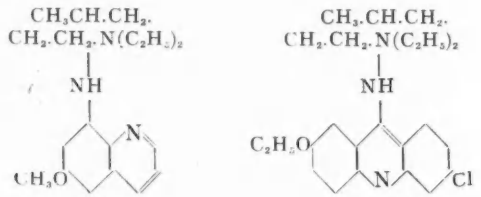
The fact that there were suitable strains and a technique for carrying out amœbicidal tests *in vitro* suggested the testing of a series of compounds, originally prepared for another purpose, with interesting results. This investigation had its origin in Gunn and Marshall's (1920) discovery, that harmine and harmaline had some therapeutic action in malaria.

Antimalarial Agents

Since harmine and harmaline are readily accessible in quantity by extraction from *Peganum harmala*, and their chemical constitution has features in common with those of known antimalarial agents such as quinine and plasmoquin, it was thought of interest to prepare a number of derivatives of these alkaloids in order that they might be tested for antimalarial action. Attention had previously been focused on studies of homologous series in the course of the work of 4-*n*-amyl-*m*-cresol. This suggested that perhaps replacement of the methoxy-group of harmine or harmaline by higher alkyloxy-groups might yield substances of increased antimalarial action and the homologous series of normal alkylharmols from methylharmol (harmine) up to dodecylharmol was prepared.

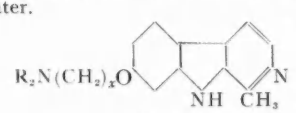


The possibility that some members of these series might have other chemotherapeutic uses was then examined, and it was found that both bactericidal and amœbicidal activity increased, on ascending the homologous series, up to a point and then started to fall. Peaks of bactericidal activity were reached at butyl for *B. typhosus* and at amyl for *S. aureus*, whilst the peak of amœbicidal activity was reached at *O*-*n*-nonylharmol. The salts of this and other high members of the series were very sparingly soluble in water, and consequently a further series of compounds was prepared, with the hope of obtaining more readily soluble compounds. The method adopted was to add a further salf-forming group to the molecule in the form of a terminal dialkylamino-group, as in the antimalarials, plasmoquin (VI) and atebrin (VII).



(VI) (VII)

In this way there were made a series of derivatives of harmol having the general formula (VIII) given below, the salts of which proved, as had been expected, to be readily soluble in water.



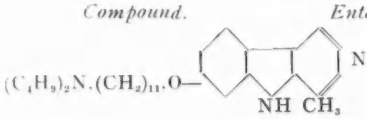
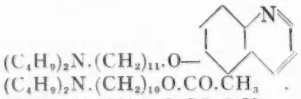
(VIII)

The size of both R (the N-alkyl groups) and x the number of carbon atoms in the chain separating N from O was varied, and the results may be illustrated by reference to a series in which the decyl group (x = 10) was a common factor, whilst the dialkylamino group was varied.

Compound.	*Minimum concentration lethal to Entamœba histolytica.*
O-κ-Dimethylaminodecylharmol	1 in 300,000 to 1 in 500,000
O-κ-Diethylaminodecylharmol	1 in 200,000 to 1 in 500,000
O-κ-Di-*n*-butylaminodecylharmol	1 in 750,000 to 1 in 2,000,000
O-κ-Di-*n*-amylaminodecylharmol	1 in 750,000 to 1 in 3,000,000
O-λ-Di-*n*-butylaminoundecylharmol	1 in 750,000 to 1 in 4,000,000
O-*n*-Nonylharmol	1 in 200,000 to 1 in 500,000
Emetine hydrochloride ..	1 in 2,000,000 to 1 in 10,000,000

The "Peak" of the Series

It was thus found that the activity of members at the peak of the series, such as *O*-λ-di-*n*-butylaminoundecylharmol, was many times that of O-*n*-nonylharmol, and this fact led us to suspect that the harmol residue might not be an important contributor to the amœbicidal properties of the molecule. A number of compounds were then prepared in which dibutylaminodecyl (or undecyl) groups were introduced into molecules of varying structures. The last column in the following table shows the limits of the range of the minimum concentration found lethal to *Entamœba histolytica* in three days, under the conditions laid down by Laidlaw, Dobell and Bishop (*loc. cit.*).

Compound.	*Minimum concentration lethal to Entamœba histolytica.*
	1 in 750,000 to 1 in 4,000,000
	1 in 100,000
$(C_4H_9)_2N.(CH_2)_{10}O.CO.CH_3$	1 in 100,000
$(C_4H_9)_2N.(CH_2)_{10}O.CO.C_6H_5$	1 in 100,000
$(C_4H_9)_2N.(CH_2)_{10}N.(C_4H_9)_2$	1 in 2,000,000

It was thus shown that the attachment of the group $(C_4H_9)_2N.(CH_2)_{10}$ to a simple substituted amino group gave very high efficiency.

A long series of tetraalkyldiamino paraffins of the general formula $NRR'.(CH_2)n.NRR'$ was then prepared, and the minimum amœbicidal concentration under the optimum conditions for emetine determined. In the first place derivatives of heptane and decane were examined; of the heptane series the tetraethyldiamino and tetra-*n*-butyldiamino compounds were prepared and tested. The tetrabutyl member of the series was superior as an amœbicide to the tetraethyl one, but neither showed more than a fraction of the efficiency of the best harmol derivative. More promising results were obtained with the corresponding decane derivatives and ultimately the efficiency of dibutylaminoundecylharmol was equalled or even, in some of our tests, surpassed.

The results of a test in which a number of decane derivatives of the general formula, $R_2N.(CH_2)_{10}NR_2$, were examined simultaneously, showed that the "peak" of the series was κα-tetra-*n*-amyldiaminodecane, thereafter used as a standard of comparison. A number of variants on tetraamyldiaminodecane were then made in which in the place of the symmetrical tetraamyl group various other combinations were tried. A number of compounds were also prepared in order to test the amœbicidal properties of related classes of compounds; these included (1) long chain monamines, (2) quaternary benzylammonium chlorides containing a long chain member. (3) long chain mono- and di-amidines, and (4) compounds in which the 10 aliphatic carbon atoms of decane are replaced in part by 4 carbon atoms of a benzene ring and in part by 2 atoms of oxygen. None of these approached tetraamyldiaminodecane in amœdicidal efficiency *in vitro*.

REFERENCES.

BRINDLEY and PYMAN: *J. Chem. Soc.*, 1067 (1927).
CHAMBERS (and others): *J. Gen. Physiol.*, **10**, 739; *Proc. Soc. Exp. Biol. Med.*, **24**, 760 (1927).
CHILD and PYMAN: *J. Chem. Soc.*, 2010 (1929).
—— *J. Chem. Soc.*, 36 (1931).
COULTHARD, MARSHALL and PYMAN: *J. Chem. Soc.*, 280 (1930).
DALE and DOBELL: *J. Pharm. Exp. Ther.*, **10**, 399 (1917).
DOBELL and LAIDLAW: *Parasitology*, **18**, 206 (1926).
DOHME, COX and MILLER: *J. Amer. Chem. Soc.*, **48**, 1688 (1926).
GUNN and MARSHALL: *Proc. Roy. Soc. Edin.*, **40**, 140 (1920).
HENRY AND BROWN: *Trans. Roy. Soc. Trop. Med. Hyg.*, **61**, 17 (1923).
JEPPS and MEAKINS: *B.M.J.*, ii, 645 (1917).
JOHNSON and LANE: *J. Amer. Chem. Soc.*, **43**, 348 (1921).
KNOWLES (and others): *Ind. Med. Gaz.*, **58**, 151 (1923).
LAIDLAW, DOBELL and BISHOP: *Parasitology*, **20**, 207 (1928).
LOW: *B.M.J.*, ii, 715 (1915).
—— (reported by Pyman): *J. Chem. Soc.*, **113**, 222 (1918).
ROHDE: *Zentr. Chir.*, 2134; *Deut. med. Woch.*, **53**, 352 (1927).
ROSENHEIM, M. L.: *Lancet*, i, 1032 (1935).
SCHULEMANN: *Proc. Roy. Soc. Med.*, **25**, 897 (1932).
WENYON and O'CONNOR: *J. Roy. Army Med. Corps*, **28**, 473 (1917).

Congo Copal

Preparation of a Butyric Ester

THE preparation and properties of a butyric ester of Congo copal, are described by Mertens, Hellincke, and Hoffman, (*Bull. Soc. Chim. Belg.*, 1937, *46*, 6, 253). Congo copal is heated with half its weight of technical absolute butyric acid, for four hours under reflux, and then the excess of butyric acid removed by distillation. It was established that the product contains, not only the oxyacid constituents of the original copal, but also the dicarboxylic acid part, as esters. In this it differs from the acetylated product, which contains only the oxyacid portion; 100 parts of copal yielded 110 parts of ester.

The product is a pale yellow resinuous mass, having a density of 1.025, an acid value of 139.0, an iodine number of 97.8, a softening point of 70.5° C., and a melting point of 117-118° C. It is easily soluble in a variety of solvents such as sulphuric ether, isobutylic and amyl alcohols, methyl acetate and trichlorethylene; moderately soluble in ethyl and benzyl alcohols, ethyl acetate, and chloroform, and difficulty soluble in methyl alcohol, acetone benzene, carbon disulphide, and carbon tetrachloride. It possesses all the advantageous properties of the acetyl ester "acetocopal," described by Mertens and Hellinckx, (*15th Cong. Chim. Ind.*, 1935), and should find similar applications particularly as a plasticiser.

Dyestuffs Advisory Licensing Committee

THE Board of Trade have re-appointed Sir Robert Waddington to be chairman, and Mr. S. T. Kinsman, Sir Henry Sutcliffe Smith and Mr. W. J. U. Woolcock, to be members of the Dyestuffs Advisory Licensing Committee for a further period of three years. Sir Miles E. Mitchell, J.P., has been appointed to the committee for a period of three years.

Recent Developments in Textile Processing

By A. J. HALL, B.Sc., F.I.C., F.T.I.

IN the mercerisation of cotton piece goods it makes little difference to the dyer whether or not all the impurities originally present in the cotton fabric are completely or uniformly removed in the processing employed to prepare the fabric for mercerising or in the washing which follows mercerising for the purpose of removing all traces of caustic soda; any slight differences of depth of shade in the dyed fabric which might be caused by these impurities are not noticeable in a fabric. But the case is quite different with a yarn, for when this is knitted into stockings or fabric and then dyed it is a peculiar fact that any slight differences in shade are accentuated and frequently the knitted material will be seen to have definite colour stripes. This necessity for giving more care to the mercerising of cotton yarns has recently been investigated by S. M. Edelstein (*Am. Dyestuff Rep.*, 1937, *26*, 427).

Uneven Dyeing Properties

It appears that the pectic and non-cellulosic impurities ordinarily present in cotton and which may be left in incompletely purified mercerised cotton yarn give this an increased affinity for a direct dye such as Chlorazol Blue RW and a decreased affinity for a basic dye such as Methylene Blue. Using this fact Edelstein has devised a method by which it is possible to determine whether uneven dyeing mercerised cotton yarn has this defect because it has previously been mercerised unevenly (this is, unevenly exposed to the action of the caustic soda used) or whether its uneven-dyeing properties are due to an uneven content of non-cellulosic impurities.

The test involves knitting three small pieces of fabric from the yarn. Two of these are scoured for 5 minutes at 140 F. in a 1 per cent. solution of Turkey red oil, and one of these is dyed with Chlorazol Blue RW, while the other is dyed with Methylene Blue. The third piece of fabric is very thoroughly twice scoured in boiling 10 Tw. caustic soda, rinsed, neutralised with acetic acid, rinsed, and then dyed with Chlorazol Blue RW.

If the original uneven-dyeing properties of the yarn were due to an uneven content of non-cellulosic impurities then those parts of the yarn which dye deeper with Chlorazol Blue RW will dye lighter with Methylene Blue, and the thoroughly scoured fabric with caustic soda will dye evenly. But if the yarn has been unevenly mercerised then the opposite results obtained in dyeing with the direct and basic dyes will not be produced nor will the caustic soda scour cause the yarn to dye evenly with Chlorazol Blue RW. This test is of considerable importance to yarn mercerisers in so far as it enables them to trace the cause of an effect often met with and which frequently gives them much trouble.

Manufacture of Coloured Viscose Rayon

In the ordinary way of things it is unlikely in the near future that sufficient quantities of coloured viscose rayon yarns will be produced by the rayon manufacturer to cause any appreciable reduction in the amount of textile materials sent to the dyer and printer for colouring. The public demand for a very wide range and variety of coloured fabrics and garments could never be satisfied with the use of a limited number of standard coloured rayon yarns. Yet a certain amount of progress is being made in this direction and, according to G. Lepage (*Textilber.*, 1937, *18*, 647), who has published an article describing the various stages in attaining success in this field, the technical difficulties have been overcome by the use of water-soluble esters of vat dyes (for example, the Indigosols and Soledons).

While all other types of dyes have proved unsatisfactory, either because they lead to clogging up of the spinning jets or because they cannot be relied upon to give an evenly coloured rayon, it seems that Indigosol dyes are entirely satisfactory since by the Dosne method (B.P. 403,049) they can be added to the viscose solution before spinning and are perfectly stable and soluble in this medium. Neither do these dyes affect the normal process used in ripening the viscose solution to a suitable state for spinning. After spinning the colour in the rayon is developed by treating it with an acid oxidising agent. Microscopical examination of the dyed rayon which results indicates that the dye is uniformly and thoroughly dispersed throughout the cellulose so that no aggregates of dye particles can be distinguished.

Dyeing of Acetate Rayon with Naphthol as Dyes

This method for producing coloured viscose is of more importance at the present time for manufacturing coloured film for wrapping purposes, and in this connection it must be remembered that such film is now being cut into very narrow strips and used for producing special coloured and lustrous effect in yarns and fabrics.

Insoluble azoic dyes are being increasingly applied to cotton goods because of the general excellent all-round fastness of the resulting shades, and it is now found that by a suitable dyeing procedure these same dyes can be applied to acetate rayon with the added advantage that the light fastness of the shades is higher than on cotton. R. Metzger and H. Rohling (*Textilber.*, 1937, *18*, 644) have lately described practical methods for dyeing acetate rayon with these dyes.

It is possible to dye the rayon by applying to it an alkaline solution of a naphthol followed by treatment with a solution of a diazotised base (amine) and this follows the general method employed for cotton. But there is an alternative process which utilises the special power of acetate rayon to act as an organic solvent towards bases and naphthols. In this method the rayon is dyed with a suspension of the base and then with a suspension of the naphthol, so that both of these substances are together present in the rayon but not yet coupled so as to form a coloured pigment (azoic dye). The rayon is then treated in a bath containing hydrochloric acid and sodium nitrite whereby the base in the rayon is diazotised so that it can at once couple with the naphthol and so form a dye which colours the rayon. A table is given showing the fastness properties of a number of naphthol-base combinations obtainable with the aid of those products already in use for dyeing cotton.

Anti-Crease and Permanent Embossed Finishes

According to B.P. 462,005 it is very interesting to note that an acid solution containing formaldehyde and a large proportion of an inorganic salt such as calcium or magnesium chloride (such a salt has a strong affinity for water, but its concentrated aqueous solution has no definite swelling power on cellulose) exerts a peculiar action on a cellulose fibre, so that when afterwards dried it is considerably more resistant to creasing. Also, if fabric be treated with this special formaldehyde solution it can afterwards be embossed and the resulting pattern is then fast to washing.

It appears that the amount of inorganic salt present in the formaldehyde solution must not be below a certain minimum, otherwise the desired modification of the cellulose (cotton, viscose rayon, linen, etc.) fibre is not obtained. Thus if viscose rayon fabric is steeped for 15 minutes in a solution containing per litre, 100 grams of hydrochloric acid, 200 grams of formaldehyde, and 443 grams of calcium chloride, then thoroughly washed, soaped and finished (embossing or schreinering) it is resistant to creasing and has a permanent embossed appearance; but if only 200 grams of calcium chloride is present it creases readily and cannot be given a permanent mechanical finish. Yet in both cases the cellulosic fibre chemically combines with formaldehyde.

The Chemical Age Lawn Tennis Tournament

Finals at Oxted This Afternoon

TO-DAY'S finals of the seventh annual CHEMICAL AGE Lawn Tennis Tournament are to be held in ideal surroundings at White Cottage, Sandy Lane, Oxted, Surrey, by kind invitation of Mr. Victor Blagden, chairman of Victor Blagden and Co., Ltd. Oxted is in a delightful part of the country, and the garden of White Cottage, which contains a splendid hard court, is beautifully laid out and one of the most picturesque which we have seen. Altogether it is difficult to imagine a more perfect setting for an afternoon's tennis. Play is due to commence at 3 p.m. promptly and a most convenient train leaves Victoria Station at 1.28 p.m., change at East Croydon (London Bridge 1.38 p.m.). This train arrives at Oxted at 2.28, and arrangements have been made for taxis to meet this train and convey spectators in relays up to White Cottage. In addition, a Green Line 'bus leaves the station at 2.35 p.m. for the Bell Inn, Old Oxted (about 1 mile). Sandy Lane is the sharp right turning at the inn, and White Cottage is about 300 yards up the lane on the right-hand side. For those travelling by car from London, a satisfactory route is by Streatham, Croydon, and Caterham to Godstone, turning left here for Oxted, where the Bell Inn will be found on the left. The sketch map shows the exact position of White Cottage.

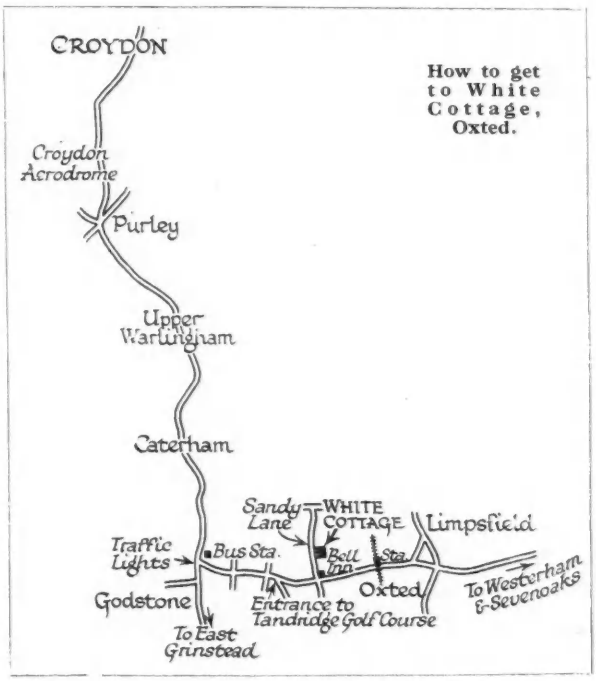
Two matches are to be played, the finals of the men's singles and doubles. These will be decided by the best of five sets, unless time is shortened by unfortunate weather conditions, in which case the best of three sets will be played. The singles match will be played first, after which there will be an interval for tea, by invitation of Mr. Victor Blagden. This will be at 4.15 p.m. approximately.

The finalists are as follows:—

SINGLES.
R. M. O. WILLIAMS, Imperial Chemical Industries, Ltd.
v
L. F. GRAPE, Borax Consolidated, Ltd.

DOUBLES.
A. E. C. WILLSHERE and L. F. GRAPE, Borax Consolidated, Ltd.
v
G. W. HOLE, Anglo-Saxon Petroleum Co., Ltd., and C. G. SMITH, Shell Mex and B.P. Ltd.

At the conclusion of the doubles match, to be played immediately after tea, Mr. John Benn, a director of Benn Brothers, Ltd., the proprietors of this journal, will present the prizes. THE CHEMICAL AGE silver challenge cup, to be held for twelve months, and the "Invicta" silver statuettes, given by Thomas Hill-Jones, Ltd., will be presented to the winners. The "Lloyd Willey" silver statuettes, given by Mr. Lloyd Willey, a director of Thomas Hill-Jones, Ltd., who has keenly supported this competition for some years, will be awarded to the runners-up.



It will be seen that the provinces are not represented in the finals this year. In the singles, Mr. R. M. O. Williams, who enters the finals for the first time, defeated the holder of the singles cup, Mr. C. C. Gough (Lever Bros., Ltd., Port Sunlight), in a very close match in the semi-finals. The other singles finalist, Mr. L. F. Grape, beat Mr. A. H. Tickner (British Celanese, Ltd.), who has been an ardent competitor in the tournament for a number of years, in the semi-final round. Mr. Grape also appears in the doubles, partnered by Mr. A. E. C. Willshere. This pair were joint winners in the doubles event last year, the final being unfinished owing to failing light. The other joint holders of the doubles challenge cup are Messrs. C. C. Gough and T. P. Williams (Lever Bros., Ltd., Port Sunlight), but this year they were eliminated

A view of the court on which the finals will be played.

Part of the garden of White Cottage.

in the second round. The appearance of Mr. Grape in both singles and doubles is not a novelty, as it has happened in the past that the same player has reached the finals of both events. But only once have both cups been won by the same player, that being accomplished by Mr. J. Haines (Anglo-Iranian Oil Co., Ltd.) in 1935, but he received a walk-over in the singles owing to an accident to his opponent.

The way in which this afternoon's players reached the finals is as follows:—

Mr. R. M. O. Williams, 1st round, beat Mr. A. A. Killick (B. Laporte, Ltd.), 6—1, 8—6; 2nd round, walk over, Mr. D. G. Blow (British Drug Houses, Ltd.), scratched; 3rd round, beat Mr. A. S. Marcar (Bovril, Ltd.), 6—2, 3—6, 6—2; 4th round, beat Mr. A. Baxter (United Yeast Co., Ltd.), 6—8, 6—4, 7—5; semi-final round, beat Mr. C. C. Gough (Lever Bros., Ltd.), 8—6, 6—4.

Mr. L. F. Grape, 1st round, beat Mr. G. L. Rolfe (Brandhurst Co., Ltd.), 6—1, 6—3; 2nd round, beat Mr. J. E. Walker (National Farmers' Union), 3—6, 6—1, 6—0; 3rd round, beat Mr. H. Bowler (Nobles and Hoare, Ltd.), 6—2, 1—6, 6—3; 4th round, beat Mr. A. W. A. Goudie (Corn Products Co., Ltd.), 7—5, 7—5; semi-final round, beat Mr. A. H. Tickner (British Celanese, Ltd.), 6—1, 6—3.

Messrs. A. E. C. Willshere and L. F. Grape, 1st round, beat Messrs. E. Dacre Lacy and F. O'Connor (Murex Welding Processes, Ltd.), 9—7, 6—3; 2nd round, walk over, Messrs. L. Giltrow (Williams (Hounslow), Ltd.), and H. Bowler (Nobles and Hoare, Ltd.), scratched; 3rd round, beat Messrs. E. T. Hancock and J. K. Woollard (Murex Welding Processes, Ltd.), 6—4, 6—2; semi-final round, beat Messrs. S. E. Chaloner and W. Speakman (Monsanto Chemicals, Ltd.), 6—4, 4—6, 7—5.

Messrs. G. W. Hole and C. G. Smith, 1st round, beat Messrs. C. G. Copp (Doulton and Co., Ltd.), and E. Smith (Riley Harbord and Law), 6—3, 6—2; 2nd round, beat Messrs. R. A. J. Bennett and F. R. O. Allen (Nobel Chemical Finishes, Ltd.), 6—3, 6—3; 3rd round, beat Messrs. A. W. A. Gowlie and G. Brewer (Corn Products Co., Ltd.), 6—0, 6—2; semi-final round, beat Messrs. R. J. Sleap (United Yeast Co., Ltd.), and F. Darton (J. Buchanan and Co., Ltd.), 6—0, 6—2.

Micro-Chemical Analysis

Instruction at Sir John Cass Technical Institute

THE new session of the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3, which extends over about 36 weeks, will begin on September 20, and students will be enrolled on and after September 15.

The Institute provides evening instruction in pure and applied mathematics, physics, chemistry, bacteriology, malting and brewing, petroleum technology, fuel technology including coal carbonisation and gas engineering (manufacture), chemical engineering, metallurgy and assaying. The science courses are arranged to meet the requirements of those engaged in chemical, metallurgical, petroleum and fermentation industries, and are held from 6 to 10 p.m. Day courses are also provided in physics, mathematics, chemistry, and metallurgy. Full facilities are provided in well-equipped laboratories for special investigations and research.

There is a course of study on micro-chemical analysis which is suitable for biochemists, analysts and advanced students of chemistry. It is designed to introduce the principles and technique of inorganic and organic micro-analysis as carried out by the late Professor Pregl and Professor Emich (Graz), and the "spot" test methods of Dr. Feigl (Vienna).

An Improved Copper Catalyst

Characteristics and Conversion Uses

THE characteristics of an improved form of copper catalyst, recently described by Griffith (*Trans. Faraday Soc.*, 1937, *33*, 412) have been studied by Taylor and Joris (*Bull Soc. Chim. Belg.*, 1937, 46, 6, 241).

Copper and magnesium hydroxides were precipitated from a solution of their nitrates with caustic soda, the CuO : MgO ratio in the precipitate being 1 : 5. After washing and drying, the copper hydroxide was reduced to metal in a stream of hydrogen at 200° C., for 5-6 hours. The brownish-red powder thus obtained retained its activity for the hydrogenation of ethylene unimpaired after heating to 560° C., whereas an unsupported catalyst would lose its activity after heating at 460° C.

With the new catalyst, the hydrogenation of ethylene to ethane proceeded very rapidly at 0-40° C., the rate of reaction increasing with the temperature in this range. Similarly, rapid conversion of benzene to cyclohexane was produced at an optimum temperature of 225°, an efficiency of 64 per cent. being obtained when 6.5 cc. per minute were passed over a quantity of catalyst containing 0.75 g. of copper. Ethylene or benzene in excess acted as poisons, slowing down the respective reactions. Dehydrogenation of cyclohexane was also accomplished with an efficiency of 24-37 per cent. between 400° and 460° C., no cracking occurring.

For reactions involving the scission of a C-C bond, i.e., cracking reactions, the catalyst showed only a poor activity as compared with nickel, and could, therefore, be used in place of the latter in cases where cracking is undesirable.

A New Emulsifying Agent

Pastes which can be Frozen without Damage

INTRODUCED under the name of Glycoride by the Glyco Products Co., Inc., glycol glyceryl stearate provides an emulsifying agent which is free from alkalies, soaps, amines and inorganic salts, and therefore especially useful in the manufacture of certain emulsified oil and wax products.

Glycoride is a light coloured, wax-like solid, which readily disperses in hot water, forming stable fluid or paste emulsions—according to concentration—on cooling. A 1 per cent. dispersion in water has a pH of 5.9; emulsions have a pH of 6.4, provided no alkali producing materials are added. Paste emulsions made with glycoride withstand freezing to a considerable extent anr in most cases even when frozen can be restored to their original state by warming gently.

Further information can be obtained from Rex Campbell and Co., Ltd., London.

Separation of Aluminium

A New Technique

ACCORDING to Willard and Tang (*Ind. Eng. Chem.*, Anal. Ed. 1937, *29*, 357-63), aluminium can be accurately separated from large amounts of calcium, barium, magnesium, manganese, cobalt, nickel, zinc, iron, cadmium, and copper by precipitation as the dense basic succinate by boiling with urea the acid solution containing succinic acid. Hydrolysis of the urea forms ammonia gradually in a homogeneous solution, resulting in a pH of 4.2 to 4.6. Owing to the dense nature of the precipitate, it is easily filtered and washed and shows much less adsorption of other salts than does the precipitate obtained by the usual methods. The basic sulphate precipitated in this way is also dense, but the pH must be 6.5 to 7.5 and separations in certain cases are less satisfactory. The accuracy of separations made by the urea method is far superior to that obtainable by the use of ammonia. This is attributed to a combination of four important factors—a dense precipitate, a slow, uniform increase in pH, a homogeneous solution, and a low final pH.

References to Current Literature

British

ANALYSIS.—Rapid method for the determination of invert sugars. H. C. S. de Whalley, *Intern. Sugar J., 39,* 300-301.

The sampling of coal. L. A. Bushell, *J. Inst. Fuel, 10,* 384-408.

The detection of bromide and iodide in the presence of large quantities of chloride. R. G. Aickin, *J. Australian Chem. Inst., 4,* 267-269.

POLYMERISATION.—The mechanism of polymerisation. H. Brunner and E. H. Farmer, *J.C.S.,* 1937, 1,039-1,046.

DYEING.—Dyeing synthetic fibre combinations. E. W. Pierce, *Canadian Textile J., 54,* No. 16, 36-37.

ORGANIC.—Oxidation of phenols by means of hydrogen peroxide in the presence of inorganic catalysts. B. C. Kar, *J. Indian Chem. Soc., 14,* 291-319.

OXIDATION.—Recent German advances in the mechanism of oxidation and tarnishing of metals. L. E. Price, *Chem. and Ind., 56,* 769-773.

RUBBER.—Studies on the Joule effect of rubber: Thermal effect on stretched latex vulcanisates. Y. Tanaka and S. Kambara, *India-Rubber J., 94,* No. 9, 7-9.

Industrial microscopy: Rubber fillers. C. H. Butcher, *Ind. Chem., 13,* 301-302.

INKS.—The drying of printing inks. J. D. Cohen, *Paint Manuf., 7,* 246-250.

COLLOIDS.—The action of monohydric alcohols on gelatine. J. A. Saunders, *Biochem. J., 31,* 1,093-1,096.

MISCELLANEOUS.—The chemical utilisation of waste wood. E. C. Jahn, *Canadian Chem. Met., 21,* 247-250.

American

PAINTS.—Study of new lacquer raw materials. P. H. Faucett, *Paint Oil Chem. Rev., 99,* No. 15, 14-16, 18.

TEXTILES.—Reducing agents in textile printing and dyeing. *Textile Colorist, 59,* 515-516, 560.

ELECTROLYSIS.—Solution efficiency. A. Fletcher, *Amer. Electro-Platers' Soc. Monthly Rev.,* 1937, 609-612.

ETHERIFICATION.—Sulphonic and sulphuric esters as alkylating agents in liquid ammonia. A. L. Kranzfelder and F. J. Sowa, *J. Amer. Chem. Soc., 59,* 1,490-1,492.

RUBBER.—The influence of metallic oxides on neoprene properties. H. W. Starkweather and H. W. Walker, *Ind. Eng. Chem., 29,* 872-880.

INORGANIC.—The dehydration of calcium sulphate hemihydrate. H. B. Weiser and W. O. Milligan, *J. Amer. Chem. Soc., 59,* 1,456-1,458.

PULP.—Some colloid-chemical aspects of clay as a loading material. F. A. Hauser, *Paper Trade J., 105,* No. 7, 39-41.

RESINS.—Manila resins: Origin, properties and applications. C. L. Mantell and H. L. Rubenkoenig, *Ind. Eng. Chem., 29,* 855-859.

OILS.—The influence of pretreatment of linseed oil on its film properties. A. V. Blom, *Paint Oil Chem. Rev., 99,* No. 17, 9-11.

The composition of expressed lumbang oil. G. S. Jamison and R. S. McKinney, *Oil and Soap, 14,* 203-205.

ANALYSIS.—The determination of the cellulose value of lint for the chemical industry. L. N. Rogers, *Oil and Soap, 14,* 199-203.

MISCELLANEOUS.—Consistency measurement of rubber and rubber compounds. J. H. Dillon and L. V. Cooper, *Rubber Age, 41,* 306-310.

German

RESINS.—The applications of artificial resins in the artificial leather, leather substitute, and coating industries. F. Ohl, *Ole Fette Wachse,* 1937, No. 7, 9-10.

CONDENSATION.—The kinetics of thermal polycondensation reactions. H. Dostal, *Monatshefte f. Chem., 70,* 324-328.

SAPONIFICATION.—The saponification of fats by the autoclave and the Twitchell processes. H. Zilske, *Seifensieder-Ztg., 64,* 528-530.

PAINTS.—The applications of chlorinated diphenyl in the lacquer industry. Dr. Lehrer, *Farbe u. Lack,* 1937, 355-356.

CARBONISATION.—The carbonisation of coal: Influence of bitumens on the division of sulphur in dry distillation D. Mirew, *Brennstoff-Chem., 18,* 313-316.

CELLULOSE.—The viscosity of cuprammonium solutions of cellulose. H. Lachs and A. I. Grosmann, *Monatshefte f. Chem., 70,* 302-317.

GLASS.—Technical boric acid glasses. O. Knapp, *Glashütte, 67,* 495-499.

ORGANIC.—The formation and the decomposition of polyoxymethylene. J. Löbering, *Z. Elektrochem., 43,* 638-643.

The Friedel-Crafts reaction: The synthesis of new compounds used in pharmaceutical chemistry. P. Kräuzlein, *Ber., 70,* 1,776-1,787.

FATS.—The per-acid oxidation of fats. H. Böhme and G. Steinke, *Ber., 70,* 1,709-1,713.

SOAPS.—Modern toilet soaps. J. Augustin, *Seifensieder-Ztg., 64,* 536-537.

HYDROGENATION.—The influence of sulphur on the hydrogenation of coal tar. H. Winter, G. Free and H. Mönning, *Brennstoff-Chem., 18,* 320-323.

CERAMICS.—Researches in the modification of the plasticity of kaolins. W. Petersen, *Ber. Deutschen Keram. Ges., 18,* 299-308.

BLEACHING.—On the bleaching of ground wood with special consideration of modern processes. K. Meltzer, *Papier Fabrikant (techn. Teil), 35,* 297-301.

ANALYSIS.—Manganese as catalyst in the determination of hydrogen peroxide with potassium bromate. L. Szebellédy and W. Madis, *Z. analyt. Chem., 109,* 391-396.

Application of the reaction between formaldehyde and alkali bisulphites in oxidation analysis: The oxidimetric determination of iron. D. Tschawdarov, *Z. analyt. Chem., 109,* 396-402.

POLYMERISATION.—The thermal polymerisation of styrol in solution. H. Suess, K. Pilch and H. Rudorfer, *Z. phys. Chem., 179,* A, 361-370.

INORGANIC.—Secondary sodium arsenate. H. Menzel and W. Hagen, *Z. anorg. Chem., 233,* 209-235.

ELECTROLYSIS.—Electrolysis in phosphate melts. H. Hartmann and U. Conrad, *Z. anorg. Chem., 233,* 313-320.

MISCELLANEOUS.—Applications of glycol and its derivatives in the preparation of soaps, cosmetics and perfumes. H. Strauss, *Deutsche Parfümerie Ztg., 23,* 298-299.

Enzymatic wetting agents. H. J. Henk, *Seifensieder-Ztg., 64,* 568.

French

CELLULOSE.—Progress realised in the manufacture of chemical paper pulps. G. Hall, *Papier, 40,* 563-572.

ANALYSIS.—The determination of the alkaloids of opium and their derivatives by a mercurimetric method. A. Ionescu Matiu and C. Ichim, *J. Pharm. et Chim., 129,* 49-56.

The determination of celluloses. M. Brot and A. Albarranc, *Rev. Chim. Ind. Quesneville, 46,* 200-205.

INORGANIC.—On the preparation and some properties of the alkaline earth arsenates. H. Guérin, *Bull. Soc. Chim.,* 1937, 1,249-1,259.

TEXTILES.—The dressing of fabrics by means of synthetic products. L. Bonfet, *Teintex, 2,* 501-505.

RUBBER.—Chemistry and rubber: Synthetic rubbers and chemical derivatives of rubber. G. Genin, *Rev. Générale Caoutchouc, 13,* No. 131, 45-48.

PIGMENTS.—Cadmium and chromium salts as pigments. G. Sverige, *Peint. Pigments Vernis, 14,* 146-149.

ORGANIC.—Tetraethyl lead. *L'Ind. Chim., 24,* 442-446.

Chemical Notes from Foreign Sources

Poland

MANUFACTURE OF CASEIN FOR TEXTILES (lanital) will be undertaken in a factory to be built by the Polana Co. of Lodz in association with the "Wu-Pe-Em" milk powder factory of Lublin.

Roumania

CARBON BLACK MANUFACTURED by the "Microcarbon" Company, of Ploesti, is now on the Roumanian market.

CONSTRUCTION OF AN ALUMINIUM WORKS IS PLANNED by the Concordia S.A.R., of Bucharest, at an estimated cost of 300 million lei. The concern has secured the exclusive right to import the equipment of the works until November 2, 1938, with the probability of an extension.

Russia

ELECTROFILTERS FOR CLEANSING WASTE GASES are to be installed at the Moscow Power Station.

AN EXPERIMENTAL PLANT FOR UTILISING FLUE GASES in sulphuric acid manufacture is being started up at the Kaschivsky Power Station.

IN A NEW PROCESS OF CARBON BLACK MANUFACTURE, hydrocarbon gases are subjected to a temperature of 1100° to 1200° C. when a 40 per cent. yield is obtained and the residual gas contains up to 75 per cent. hydrogen. A small-scale plant to try out the process was recently put into operation in the S.K. Rubber Works at Baku.

Czechoslovakia

FOLLOWING THE OBSERVATION by R. Barta that the hardening of lime mortar is accelerated by the joint presence of carbon dioxide and water vapour at an elevated temperature, it is proposed to utilise cement furnace gases for this purpose. These contain the ingredients mentioned while the cement dust also present intensifies the hardening effect (*Chem. Listy Vědu Prumysl., 30,* 319).

Jugoslavia

A NEW CHEMICAL MANUFACTURING CONCERN has been registered under the name of Vilmos Spicer and Co., to market sodium bicarbonate, laundry blue and graphite, among other products.

COPPER AND CHROMIUM ORE DEPOSITS have been located in the Maglaj district. It is understood that the Mines de Bor is jointly interested with the Behina Gold Mines, Ltd., in the exploitation of Jugoslavian copper ore finds.

France

A NEW BUTANE-MANUFACTURING PLANT has been laid down by the Produits Chimiques et Raffineries de Berre.

THE REPORT OF THE BOZEL-MALETRA CO. for 1936 discloses a net profit of 8½ million francs (previous year 8.2 million francs). Dealing with its associated companies, the report announces increased profits by the Produits Azotés and the Société Acétosynthèse, but the surplus in each case was utilised for writing-off purposes. Dividends will be distributed by the Plasco Company and the Société Commerciale d'Applications Chimiques. The Société des Colles et Gélatines Françaises made a net profit of 273,000 francs which will go to writing-off.

Germany

SODIUM PERCHLORATE ($NaClO_4.H_2O$) is superior to sodium chlorate as a weed killer, according to E. Funck, of the University of Jena. It is present as an impurity in Chile saltpetre which accounts for occasional damage to vegetation by this fertiliser. Fire risks with the chlorate and perchlorate can be obviated, in this investigator's experience, by admixing 10 per cent. sodium bicarbonate, the carbon dioxide given off when hot acting as an extinguisher. A similar purpose is served by calcium bisulphite.

Japan

POTASSIUM PERMANGANATE is now being made at the rate of 1 ton per day by Nippon Kagaku Kogyo K.K.

TRANSPARENT PAPER MANUFACTURE HAS BEEN COMMENCED by Nippon Film Kogyo K.K. at Yashi (province of Shiga). There are now four Japanese producers of this article, the others being Showa Tomeishi K.K. (factory at Takatouki); Showa Kagaku Kogyo K.K.; Nichiman Cellophane K.K. (factory at Yokkaichi).

Aluminium Alloys

Degasification with Aluminium Chloride

THE degasification of aluminium alloys with aluminium chloride, as an alternative to chlorine, has been studied by Mann (*Metal Ind.*, 1937, *51*, 4, 89). Charges (100 lb.) of four different alloys were heated to 700° C. in an oil-fired furnace, and a small quantity of commercial aluminium chloride, wrapped in aluminium foil, was pushed in with a plunger, a strong draught being maintained to remove the toxic gases produced. Practically complete elimination of "pin-spotting" and "specking" was achieved in every case, which was assisted by the low pouring temperature of 700° C., which it is considered should not be exceeded except in special circumstances.

In the case of those alloys which were heat treated, this use of aluminium chloride produced an increase in tensile strength which, in the case of "hydronalium," was as high as 60 per cent.; the elongation of this alloy increased by 3.5 per cent., but in other cases no effect, or a slight reduction in elongation, was produced. The method appears to have the advantages of the chlorine method of degasification without its disagreeable, and sometimes doubtful effects.

Fumigation Fatality

Coroner's Tribute to Police

RETURNING a verdict of "accidental death" in the case of Mrs. Alice Jenkinson, who was carried unconscious from a house in Prideaux Place, Percy Circus, King's Cross, and died later, the jury recommended that strong precautions in relation to surrounding buildings should be taken when fumigation was taking place. Four other persons were also affected but recovered.

Mr. Fred Jenkinson said that he and his wife occupied the room in the basement of the house in Prideaux Place. He was now living in the same room and could still detect the odour.

Dr. Dorothy Mary Vaux, pathologist at the Royal Free Hospital, said that death was due to prussic acid inhaling.

Miss Marian Cable, estate manager of the property, said that the house in Cumberland Terrace which was being fumigated backed on to the house where the fatality occurred. Notices were sent to adjoining property stating what would be taking place.

Mr. J. W. James, who, with another employee of the company, did the fumigation, said he inspected the house in Prideaux Place when the gassing was at its height.

Mr. S. F. Spring, a director of the London Fumigation Co., said that when tests were made last Thursday the general atmosphere of the house was clear, but in the cupboard there was a reaction to a chemical test. The floorboards were lifted and the earth underneath was saturated. It was the first time he had known that to be the case.

Mr. W. Bentley Purchase, the St. Pancras coroner, said that he would bring to the notice of the Commissioner the good work of the police, particularly of Constable Freeland.

Personal Notes

CAPTAIN FRANK ASHTON BELLVILLE, of Tapillon Hall, Market Harborough, Leicestershire, a director of J. and J. Colman, Ltd., who died on September 22, has left estate valued £394,397.

DR. WERNER KUHN, who is extraordinary professor of physical chemistry at Carlsruhe, has been appointed full professor at Kiel, in succession to Professor Schwarz, who has been transferred to the chair of chemistry at Königsberg.

DR. J. DONALD POLLOCK has been elected president of the British Oxygen Co., Ltd., and MR. S. J. L. HARDIE has been

Dr. J. Donald Pollock.

elected chairman of the board; SIR ALEXANDER STEWART, chairman of Commonwealth Industrial Gases of Australia, has been elected a director.

SIR SAMUEL HOARE, Home Secretary, will be the principal guest at the annual dinner of the Association of British Chemical Manufacturers, which will be held at Grosvenor House, London, on October 14.

SIR RICHARD A. PEASE, a director of Pease and Partners, Ltd., MR. ALLEN MILLER, who is vice-chairman and managing director of Radio and Electrical Developments, Ltd., and MR. E. C. PUTTOCK, have been appointed directors of Transparent Paper, Ltd.

MR. FRANK EASTMAN, of Tayside, Perth, chairman of J. Pullar and Sons, Ltd., Perth, the British Silk Dyeing Co., Ltd., and Stevenson Bros., Ltd., and deputy chairman of the Associated Dyers and Cleaners, Ltd., has left personal estate in Great Britain valued at £2,516.

MR. ANDREW MELLON, the American millionaire who has just died, built the first independent pipe-line through Pennsylvania to compete with the Standard Oil Co. He is one of the largest shareholders of the Aluminium Company of America, which has a capital of £22,000,000.

OBITUARY

MR. J. NORTH, who was chairman of the late Syston and Thurmaston Gas, Light and Coke Co., Ltd., until bought by the Leicester Corporation, has died at the age of 82.

MR. ROBERT M'CULLOCH KATER, one of the pioneers of the high explosives industry, died at Kilmarnock, on August 25, in his 85th year. Born in Glasgow, Mr. Kater was trained as an analytical chemist, and went to Ardeer in 1875, as an employee of the British Dynamite Co., which later became Nobel's Explosives Co.

MR. D. EDMONSON BENSON, who was president of the British Launderers' Research Association for a period following its formation in 1921, has died at Southport at the age of 76. For many years and up to the time of his death he was one of the employers' representatives on the Laundry Trade Board.

From Week to Week

THE GOVERNMENT OF INDIA has restored the concessions granted under the Irwin-Gandhi pact permitting villagers to collect salt for domestic purposes.

OWING TO INCREASED COST OF MATERIALS Morris Motors, Ltd., announce that the prices of all marine and industrial engine units will be advanced 5 per cent. as from September 1, 1937.

INTERNATIONAL TAR AND CHEMICAL PRODUCTS, LTD., 27 Finsbury Square, E.C.2, have increased their nominal capital by the addition of £8,000 in £1 ordinary shares, beyond the registered capital of £2,000.

A NEW TANNERY IS TO BE ESTABLISHED at Haverigg, on the coast of Cumberland. The special nature of the water in the district has been one deciding factor in the choice of Haverigg as a site. It is understood that financial assistance will be provided by the Special Areas Reconstruction Association and the Nuffield Trust. Employment will be provided for about 150 persons.

WILD-BARFIELD ELECTRIC FURNACES, LTD., announce that the success which their lantern lecture had last year has prompted them to revise it completely with the addition of details of new types of furnaces, and the inclusion of many new slides depicting recent installations of furnaces. With the slides are provided details of the furnaces illustrated to form the basis of a lecture which should prove of interest to many societies, technical schools, etc.

DEPOSITS OF IRON ORE which may help to make Poland independent of her large imports, especially from Sweden, have been discovered at the village of Zableza, near Tarnow, in the foothills of the Carpathians. The ore, containing 40-60 per cent. of metal, is claimed to be of the same quality as that coming from Sweden. Rich metal deposits containing a high percentage of iron carbonate have also been found in the Swieto Krzys mountains between Warsaw and Krakau. Arrangements have been made for exploitation by a large industrial concern.

A PLANT FOR PRODUCING GROUND MICA of a quality admirably suited to the needs of the wall paper industry is now in operation at the works of Wall Paper Manufacturers, Ltd.

FIELD, SONS AND CO., colour printers, carton manufacturers, etc., have acquired the ordinary share capital of Williams, Jowett and Co., an old-established firm of rigid box makers in Bradford.

THE NUMBER OF CHEMICAL WORKS IN GERMANY has increased by 2.3 per cent. to 16,469 during the last two years; personnel has grown by 12.6 per cent. This development is particularly marked in central Germany where the increase is 20 per cent.

FIRE BROKE OUT AT A FACTORY which is being erected for the Delovo Smelting and Refinery Co., Shirley, on August 30, when molten pitch used for laying floor blocks overflowed from a cauldron and came into contact with the flame heating the material.

A SURVEY OF INDUSTRIAL DEVELOPMENT for 1936, prepared by the Board of Trade with the co-operation of the Home Office and the Ministry of Labour, has been published. It shows that during the year 551 factories were opened, giving employment to 53,000 workers at the end of December; 201 factories were extended, and 386 were closed down. Of the last 78 were closed on transfer to another area, and 20 on transfer of work to another factory in the same ownership.

ACCORDING TO THE FIFTH CENSUS OF PRODUCTION (1935), of which preliminary report No. 16 has just been published in *The Board of Trade Journal*, the make of synthetic resins, casein, etc., in the United Kingdom during 1935 (compared with 1934) was as follows:—Synthetic resins, solid and liuid, uncured, cured or hardened, and powder in which the value of the resin is not less than 50 per cent., 349,600 tons (228,200 tons); blocks, sheets, rods and tubes, 14,700 tons (10,400 tons); casein, celluloid, xylonite, and the like in sheets, rods, tubes, etc., 93,900 tons (100,800 tons); cellulose acetates benzyl cellulose and the like in sheets, rods, tubes, etc., 6,700 tons (5,000 tons).

UNITED WATER SOFTENERS, LTD., are holding an extraordinary general meeting on September 16 to authorise the change of the company's name to "The Permutit Co., Ltd." The sanction of the Board of Trade to the change of name has already been given.

A NEW SPECIAL COURSE IN COAL UTILISATION has been added to the curriculum of the Department of Mining at Birmingham University. The course covers a period of three years for a degree of B.Sc. During the third year the syllabus includes the preparation of coal for the market, fuels in industry, hydrogenation of coal and oil refining.

THE BRITISH OXYGEN CO., LTD., has acquired from the Hafslund Co., 1,430 shares out of the total capital of 1,700 shares of Odda Smeltverk in Oslo. Authorisation for the purchase has been granted by the Norwegian Government. The British Oxygen Co. has for many years been a buyer of substantial stocks of calcium carbide from Odda Smeltverk.

NEGOTIATIONS HAVE BEEN COMPLETED by Dorman Long and Co., Ltd., for the purchase of the Linthorpe works of the Linthorpe Dinsdale Smelting Co., Ltd., Middlesbrough. Six blast furnaces which have not been in operation since the middle of 1930 are to be pulled down. The Linthorpe Dinsdale Smelting Co. was formed in 1920, on the reconstruction of a company of the same name which was registered in 1903. After the sale of the Linthorpe works the company will still possess the Dinsdale plant, where there are four blast furnaces which have been idle for several years.

ONE MAN WAS KILLED and two men were seriously injured in an explosion in a sub-pumping chamber at Barking sewage works on August 27. The dead man was Patrick Clifford (35), of Howard Road, Barking, and the injured are Norman Green (26), of Cavendish Gardens, Barking, and John William Knight (50), of Boundary Road, Barking. The men were at work in the sub-pumping chamber. Green, who first descended the sewer, was overcome by fumes, and after he had been brought out by his colleagues the explosion occurred. Clifford was blown into the air and his body fell in the roadway 50 ft. away.

PRODUCTION OF RAYON in Great Britain in July reached a new record, amounting to 14,600,000 lb., as compared with 14,060,000 lb. in June and 13,810,000 in July last year. In the first seven months of this year production has thus been 90,490,000 lb., an increase of 4,480,000 lb. over the corresponding seven months of 1936.

THE AUSTRALIAN COMMONWEALTH GOVERNMENT, in conjunction with the Government of New South Wales, has entered into an agreement for the development of the shale oil industry in the Newnes-Capertee area of New South Wales. The two governments will jointly provide debenture capital to the amount of £500,000.

THE IMPORT DUTIES ADVISORY COMMITTEE give notice of applications for the restoration of the general *ad valorem* duty of 10 per cent. on solid insoluble quebracho extract, and for drawback under Section 9 of the Finance Act, 1932, in respect of solid insoluble quebracho extract used in the manufacture of soluble quebracho extract, whether or not mixed with other tanning extracts. Any representations which interested parties may desire to make in regard to these applications should be addressed in writing to the Secretary, Import Duties Advisory Committee, Shell-Mex House, Strand, London, W.C.2, not later than September 23.

THE OXLEY ENGINEERING CO., LTD., held their annual sports amidst favourable weather at Sicklinghall, near Wetherby, on August 28. The Staff and workpeople, together with friends amounted to over ninety, and the chairman, Mr. H. H. Hollis, attended with his wife, and Mr. G. Oxley, director and works manager, was also present. In the afternoon a very interesting cricket match was staged between the office staff and works, which the former contrived to win by a comfortable margin. The end of the cricket match marked the tea interval, and thereafter several field events were arranged during which some exciting finishes were witnessed in the 100 yards, 220 yards, and the various obstacle races. The ladies showed a good turn of speed, and carried off a number of prizes. Everyone had quite an enjoyable day and were sorry to leave for home about 10 p.m.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

NATIONAL SMELTING CO., LTD., London, E.C. August 19, £30,000, £60,000, £30,000 and £10,000 debentures dated January 16, February 28, April 2 and September 1, 1919, parts of a series already registered. *Nil. November 23, 1936. (See satisfactions.)

Satisfactions

NATIONAL SMELTING CO., LTD., London, E.C. Satisfactions August 20, of debentures registered November 7, 1918, and August 19, 1937.

London Gazette

Appointments of Trustees

ROBERT BEYER, formerly of 140 Piccadilly, London, W.1 (described in Receiving Order as residing at 22 Farm Street, Mayfair, London, company director, research chemist and inventor.—Torquil John Murdoch Macleod, 1 and 2 Bucklersbury, London, E.C.4, has been appointed trustee.

Company News

Anglo-Alpha Cement.—The net profit for the year to June 30 last is £91,177. Of a total of £82,388 standing at the credit of the share premium account, £76,094 has been used to meet the amalgamation and issue expenses, etc., and pay the debenture interest to the commencement of operations at the Hennenman factory, leaving a balance of £6,293 carried to appropriation account. The 5 per cent. dividend takes £41,929 and £40,000 is transferred to general reserve, leaving £30,874 to be carried forward.

Greeff-Chemicals Holdings.—The dividend on the 5½ per cent. cumulative preference stock in respect of period April 1 to September 30, 1937, will be paid on September 30 to stockholders registered September 17.

United Indigo and Chemical.—The net profit for the year to June 30, 1937, is £10,762 (against £8,417), and available balance £27,053 (£25,197); ordinary dividend 7½ per cent. for year (6½ per cent.); forward £16,365 (£16,291).

Canadian Industries.—An interim dividend of 1¾ per cent. on 7 per cent. cumulative preferred stock for the quarter ending September 30, 1937, is payable October 15, 1937, to shareholders registered on September 30, 1937.

New Companies Registered

Carmac Laboratories, Ltd.—Registered August 31. Capital £3,000 in 20,000 ordinary shares of 1s. each and 2,000 preference shares of £1 each. To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists. Directors: Harold Barkas-Carlile and Ian M. McLeod. Registered Office: 163 High Street, Hampton Hill, Middlesex.

Passburg Engineering Co., Ltd.—Registered August 30. Capital, £1,000 in 1,000 shares of £1 each. To carry on the business of chemical engineers, makers of chemical plant and materials, laboratory proprietors, metallurgists and engineers, etc. Directors: Hugh Griffiths, The Laurels, Upton Road, Bexley, Kent, chemical engineer; Ronald F. Mason. Registered office: 20 Grosvenor Gardens, S.W.1.

Chemical Trade Inquiries

The following trade inquiry is abstracted from the "Board of Trade Journal." Name and address may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Austria.—An agent established at Vienna wishes to obtain the representation of United Kingdom exporters of oils and fats. (Ref. No. 145.)

Books Received

Steels for the User. By R. T. Rolfe. Pp. 280. London: Chapman and Hall, Ltd. 21s.

Reagent Chemicals and Standards. By Joseph Rosin. Pp. 530. London: Chapman and Hall, Ltd. 30s.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates. Price changes, however, are reported for acid carbolic (crystals), naphthalene (crude, whizzed or hot-pressed), and pyridine (90/140). Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Although perhaps a shade better than it has been during recent weeks business in both light and heavy chemical products on the Manchester market during the past week has been on no more than a moderate scale, although as most of the biggest consumers in the district are well covered for supplies up to the end of the year new bookings even when the holiday influences are definitely out of the way are not likely to be very substantial between now and the beginning of 1938 contract orders. On the whole, however, there is a fair movement of supplies into consumption and firm price conditions in most sections of the market are again reported. In the by-products market a feature of late has been the pronounced strength of both crude and crystal carbolic, whilst the recent advance in pyridine has been maintained.

GLASGOW.—There has been an improved demand for chemicals for home trade during the week, though export inquiries remain very limited. Prices generally continue very firm at about last week's figures, with no important changes to report. Only a moderate volume of business is reported in coal tar products and conditions generally are more or less unchanged. Carbolic acid continues a bright feature of the market, while in contrast cresylic acid is dull. Prices shown for the latter product must be treated as nominal in the absence of evidence of fresh transactions on a noteworthy scale. Creosote is moving well against contract, and new business on a fair scale has been booked at current values. Export pitch is receiving more attention.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9¼d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £54 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10½d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish £17 10s., ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d

COPPER SULPHATE.—GLASGOW: £24 per ton.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35. GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35 10s.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £37 per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £36 10s. per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £37 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; biehloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

PHENOL.—7¾d. to 8½d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., net, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM IODIDE.—B.P. 5s. 6d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—Firsts lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £37.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77°, £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., net, carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 5s. per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt., minimum 3 cwt. lots.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHATE.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £15. MANCHESTER: Commercial, £10; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £7 15s. per ton for 6-ton lots d/d.

SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—4d. per lb. for ton lots. GLASGOW: 5d. to 5¾d. ex store. MANCHESTER: 4d. to 4¾d.
SODIUM SILICATE.—£9 10s. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHATE OF COPPER.—£20 per ton, less 2%, in casks. MANCHESTER: £22 per ton f.o.b. SCOTLAND: £24 per ton less 5%, Liverpool, in casks.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
ZINC SULPHATE.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality
CADMIUM SULPHIDE.—7s. 8d. to 7s. 11d. per lb.
CARBON BISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON BLACK.—3 11/16d. to 4 13/16d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¾d. to 5¼d. per lb.; dark, 4d. to 4¼d. per lb.
LAMP BLACK.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—30%, £16 10s. to £17 5s. per ton.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
ZINC SULPHIDE.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: September, 1937, £7 5s. per ton; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: September, 1937, £7 7s. 6d. per ton; October, £7 8s. 9d.; November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
NITRO-CHALK.—£7 10s. 6d. per ton for delivery up to June 30, 1938.
NITRATE OF SODA.—£8 per ton for delivery up to June 30, 1938.
CONCENTRATED COMPLETE FERTILISERS.—£10 12s. to £11 1s. per ton for delivery up to September 30, in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 5s. to £13 5s. per ton for delivery up to September 30, in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 5s. 3d. to 5s. 5d. per gal.; 99/100%, 5s. to 6s., according to specification; pale 99%, 5s. 6d. to 5s. 8d.; dark, 4s. 8d. to 4s. 10d. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 4s. 3d. to 4s. 6d. MANCHESTER: Pale, 99/100%, 5s.
ACID, CARBOLIC.—Crystals, 7¾d. to 10d. per lb.; crude, 60's, 4s. 3d. to 4s. 6d. per gal. MANCHESTER: Crystals, 9½d. per lb. f.o.b. in drums; crude, 4s. 4d. per gal. GLASGOW: Crude, 60's, 4s. 3d. to 4s. 6d. per gal.; distilled, 60's, 4s. 4d. to 4s. 8d.
BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10¼d. per gal.; motor, 1s. 4d. to 1s. 4½d.
CREOSOTE.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 5¼d. to 6¼d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¼d. to 5¾d.
NAPHTHA.—Solvent, 90/160%, 1s. 6½d. to 1s. 7½d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 90/190%, 1s. 1½d. to 1s. 3d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90% 160, 1s. 5d. to 1s. 6d., 90% 190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £9 10s. to £10 10s. per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £21 per ton f.o.b.
PITCH.—Medium, soft, 38s. per ton, in bulk at makers' works. MANCHESTER: 37s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
PYRIDINE.—90/140%, 10s. 6d. to 11s. 6d. per gal.; 90/180, 2s. 9d. to 3s. 6d. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 10s. to 11s. 1s. 0d. to 2s. per gal.
TOLUOLE.—90%, 2s. per gal.; pure, 2s. 6d. GLASGOW: 90%, 120, 1s. 10d. to 2s. per gal.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 5s. to £8 15s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.
CHARCOAL.—£6 5s. to £12 per ton, according to grade and locality.
METHYL ACETONE.—40-50%, £42 to £45 per ton.
WOOD CREOSOTE.—Unrefined 6d. to 1s. per gal., according to boiling range.
WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
WOOD TAR.—£3 to £4 per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works
β-NAPHTHOL.—9½d. to 9⅝d. per lb.; flake, 9½d. to 9⅝d.
α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10-cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, Sept. 1.—LINSEED OIL was quiet. Spot, £31 5s. per ton (small quantities); Sept., £28 12s. 6d.; Oct.-Dec., £28 15s.; Jan. to Aug., £28 12s. 6d., naked. SOYA BEAN OIL was dull. Oriental (bulk), afloat, Rotterdam, £22 5s. per ton. RAPE OIL was inactive. Crude extracted, £37 per ton; technical, refined, £38, naked, ex wharf. COTTON OIL was dull. Egyptian crude, £25 10s. per ton; refined common edible, £29 5s.; deodorised, £31 5s., naked, ex mill (small lots £1 12s. extra). TURPENTINE was slow. American, spot, 35s. 9d. per cwt.
HULL.—LINSEED OIL.—Spot quoted £29 17s. 6d. per ton; Sept., £29 2s. 6d.; Oct.-Dec., £29; Jan.-April, £28 17s. 6d. COTTON OIL.—Egyptian crude, spot, £24 10s. per ton; edible, refined, spot, £27 10s.; technical spot, £27 10s.; deodorised, £29 10s., naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £23 per ton, naked. GROUNDNUT OIL.—Extracted, spot, £30 5s. per ton; deodorised, £33 5s. RAPE OIL.—Extracted, spot, £36 per ton; refined, £37. SOYA OIL.—Extracted, spot, £30 per ton; deodorised, £33. COD OIL.—f.o.r. or f.a.s., 27s. 6d. per cwt. in barrels. CASTOR OIL.—Pharmaceutical, 44s. 6d. per cwt.; first, 39s. 6d.; second, 37s. 6d. TURPENTINE.—American, spot, 37s. 3d. per cwt.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

CURLING OF REGENERATED CELLULOSE FIBRES.—Schlesische Zellwolle, A.-G. (Germany, Aug. 20, '36.) 22351.

CURLING OF REGENERATED CELLULOSE FIBRES.—Schlesische Zellwolle, A.-G. (Germany, Sept. 12, '36.) 22352.

MANUFACTURE OF CELLULOSE.—Soc. Anon. Manifattura di Altesano. (Italy, Sept. 3, '36.) 22435.

MANUFACTURE OF ALKYL CHLORIDES.—E. H. Strange. 22425.

TREATMENT OF LIQUIDS.—G. B. L. Symonds. (Australia, Aug. 26, '36.) 22448.

PREPARATION OF LATEX.—I. Traube. 22656.

APPLICATION OF OZONE to ice-manufacture.—W. S. Welsford, and D. Rose. 22551.

REMOVAL OF FILTER-CAKE from rotary filters.—J. Wiebe. (Dec. 20, '35.) 22702.

TREATMENT OF MOLASSES.—J. S. Withers (Penning). 22335.

MANUFACTURE OF PLASTIC COMPOSITIONS.—A. J. Auchterlonie. (United States, Aug. 31, '36.) 23166.

MANUFACTURE OF PLASTIC COMPOSITIONS.—A. J. Auchterlonie. (United States, May 10.) 23167, 23168.

PROCESS FOR OBTAINING CELLULOSE from vegetable raw materials. B. Bartfay. 23104, 23224.

CUTTING OF SHEET MATERIAL.—B. B. Chemical Co., Ltd. 23256.

PRODUCTION OF PURE ALUMINA.—A. S. Burman. 23063.

CARBOXYLATION OF ALKALI METAL SALTS OF PHENOLS.—Calco Chemical Co. (United States, April 29). 23064.

MANUFACTURE OF FATTY AROMATIC CHLOROMETHYL COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie.) 23105.

MANUFACTURE OF CONDENSATION PRODUCTS.—A. Carpmael (I. G. Farbenindustrie.) 23106, 23228.

PRODUCTION OF A HIGH-VELOCITY STREAM OF COMBUSTION-GASES. J. P. Charlesworth. 22853.

REDUCTION OF ZINC ORES.—Compagnie des Metaux d'Overpelt-Lommel et de Corphalie. (Belgium, July 27.) 23069.

PRODUCTION OF SURFACE-ACTIVE PRODUCT.—Deutsche Houghton Fabrik Kommanditges. (Germany, Aug. 24, '36.) 23199.

CELLULOSE NITRATE COATING COMPOSITIONS.—E. I. du Pont de Nemours and Co., and G. R. Ensminger. 23233.

MANUFACTURE OF CATALYSTS.—H. D. Elkington (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 22975.

MANUFACTURE OF LUBRICANTS.—H. D. Elkington. 23220.

TREATMENT OF CELLULOSIC TEXTILES.—J. G. Evans. 23119.

MANUFACTURE OF COLOURED CEMENTS.—P. Gerimont. (Belgium, Feb. 10.) 23133.

PRODUCTS FOR FIXING TANNING-AGENTS.—W. W. Groves (I. G. Farbenindustrie.) 22744.

MANUFACTURE OF ARTIFICIAL STAPLE FIBRE.—W. W. Groves (I. G. Farbenindustrie.) 22745.

MANUFACTURE OF COMPOUNDS CONTAINING ACTIVE METHYLENE-GROUPS.—W. W. Groves (I. G. Farbenindustrie.) 22746.

MANUFACTURE OF PIPERIDINE COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) 22979.

MANUFACTURE OF OXO-COMPOUNDS of the cyclopentane-polyhydro-phenanthrene series.—W. W. Groves (I. G. Farbenindustrie.) 22980.

MANUFACTURE OF CONDENSATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) 23057.

MANUFACTURE OF COMPOUNDS having the character of the male sexual hormones.—W. W. Groves (I. G. Farbenindustrie.) 23058.

PRODUCTION OF FAST DYEINGS.—W. W. Groves (I. G. Farbenindustrie.) 23191.

ELIMINATION OF IRON from sulphate and oxide of alumina.—E. Hayward. 23081.

MEANS FOR EFFECTING PRECIPITATION OF COMPOUNDS.—E. Hayward. 23082.

MANUFACTURE OF EMULSIONS.—Howards and Sons, Ltd., and L. C. West. 22989.

PRODUCTION OF CARBON DISULPHIDE.—I. G. Farbenindustrie. (Germany, Oct. 19, '36.) 22918, 23068.

PRODUCTION OF DEPOLARISING COMPOSITIONS from pyrolusite.—I. G. Farbenindustrie. (Germany, Oct. 8, '36.) 22931.

PRODUCTION OF DEPOLARISING COMPOSITIONS from pyrolusite.—I. G. Farbenindustrie. (Germany, Oct. 15, '36.) 22932.

PRODUCTION OF DEPOLARISING COMPOSITIONS from pyrolusite.—I. G. Farbenindustrie. (Germany, Oct. 24, '36.) 22933.

PRODUCTION OF DEPOLARISING COMPOSITIONS from pyrolusite.—I. G. Farbenindustrie. (Germany, Nov. 6, '36.) 22934.

ROLL-FILM CASSETTES.—I. G. Farbenindustrie. (Germany, Aug. 22, '36.) 22981.

MANUFACTURE OF CONDENSATION PRODUCTS of the diphenylamine series.—I. G. Farbenindustrie. (Germany, Aug. 28, '36.) 23225.

COLOURING OF ARTIFICIAL SILK.—Imperial Chemical Industries, Ltd., C. Shaw, W. J. Grubb, and R. H. Sennett. 22799.

TREATMENT OF CELLULOSIC MATERIALS.—Imperial Chemical Industries, Ltd. 22800, 23119.

RECOVERY OF OXYGEN from gaseous mixtures.—Imperial Chemical Industries, Ltd., W. J. Woolcock, and K. C. Warne. 23118, 23120.

MANUFACTURE OF SYNTHETIC LUBRICATING-OILS.—Imperial Chemical Industries, Ltd., and A. P. Lowes. 22919.

MANUFACTURE OF PASTES.—G. W. Johnson (I. G. Farbenindustrie.) 23092.

THERMAL SPLITTING OF CARBONACEOUS MATERIALS.—G. W. Johnson (I. G. Farbenindustrie.) 23093.

PROCESS OF IMPROVING THE PROPERTIES OF VEGETABLE, ETC., MATERIALS.—G. W. Johnson (I. G. Farbenindustrie.) 23094.

MANUFACTURE OF WAX-LIKE PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 23337.

MANUFACTURE OF ALIPHATIC POLYHYDROXY COMPOUNDS of high molecular weight.—G. W. Johnson (I. G. Farbenindustrie.) 23338.

SEPARATION OF AMMONIA AND HYDROGEN SULPHIDE from gases.—G. W. Johnson (I. G. Farbenindustrie.) 23339.

SPLITTING OF CARBONACEOUS MATERIALS.—G. W. Johnson (I. G. Farbenindustrie.) 23340.

ELECTROLYTIC DECOMPOSITION OF CHLORIDES.—G. W. Johnson (I. G. Farbenindustrie.) 23341.

N. PREVENTION OF UNAUTHORISED REMOVAL OF MILK-BOTTLES, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 23027.

MANUFACTURE OF ORGANIC COMPOUNDS.—G. Lord, and F. H. Reeves. 23183.

MEANS FOR RENDERING FLUIDS COMBUSTIBLE.—H. N. McLeod. 23172.

RUBBER HYDROHALIDES.—Marbon Corporation. (March 9, '36.) (United States, March 18, '35.) 23354.

MANUFACTURE OF BENZYL-OXYALKYL AND -HYDROXYALKYL ETHERS of cinchona alkaloids.—Mellon Institute of Industrial Research. (United States, April 26.) 22747.

ELECTROCHEMICAL PRODUCTION OF MANGANESE.—Metallic Manganese Co., Ltd. (United States, Sept. 10, '36.) 23151.

APPARATUS FOR REFINING, ETC., USED LUBRICATING OIL.—S. Bramley-Moore. 23236.

MANUFACTURE OF CALCIUM HYPOCHLORITE.—J. Ourisson. (Czecho-Slovakia, Aug. 25, '36.) 23362.

PURIFICATION OF WATER.—Soc. Eau et Assainissement, Anciens Etablissement C. Gibault. (France, April 19.) 23041.

PURIFICATION OF WATER.—Soc. Eau et Assainissement, Anciens Etablisscment C. Gibault. (France, June 3.) 23042.

MANUFACTURE OF TITANIUM PIGMENTS.—Titan Co., Inc. (United States, Aug. 26, '36.) 23230.

DISTRIBUTION OF FINELY DIVIDED SOLID SUBSTANCES IN LIQUIDS. Trier Bros., Ltd., and F. N. Trier. 23189.

MANUFACTURE OF POLYMERIC AMIDES.—W. W. Triggs (Du Pont de Nemours and Co.). 23115.

DISTILLATION, ETC., OF LIQUID HYDROCARBONS and glycerides.—T. O. Wilton. 23003.

MANUFACTURE OF SEMI-PYROPHORIC COMPOUNDS.—O. F. Wyss. (Germany, Aug. 25, '36.) 23243.

Specifications Open to Public Inspection

CONTINUOUS PROCESS FOR CONVERTING SAPONIFIABLE FATS into soap and glycerin.—Procter and Gamble Co. February 18, 1936. 35895/36.

METHOD AND APPARATUS FOR TRANSPORTING LIQUEFIED GAS MATERIAL.—Linde Air Products Co. Feb. 18, 1936. 1106/37.

BITUMINOUS EMULSION and method of preparing same.—International Bitumen Emulsions, Ltd. Feb. 18, 1936. 3159/37.

MANUFACTURE OF MIXTURES OF HIGHER FATTY ALCOHOLS and of their sulphonated derivatives.—Henkel and Cie, Ges. Feb. 17, 1936. 3377/37.

METHOD OF ACTIVATING CLAYS or like siliceous crude earths.—Oesterreichische Dynamit Nobel, A.-G. Feb. 22, 1936. 3693/37.

OSCILLATING DEVICES such as mills or washers.—I. G. Farbenindustrie. Feb. 18, 1936. 3698/37.

APPARATUS FOR SEPARATING A LIQUID FROM SOLID MATTERS suspended therein.—T. A. Tesch Aktiebolag. Feb. 17, 1936. 4669/37.

PROCESS FOR IMPROVING SOLID CARBONACEOUS FUELS.—J. B. Toulson. Feb. 18, 1936. 4830/37.

PROCESS FOR DEGRADING CRUDE PHOSPHATES intended for fertiliser purposes.—Neunkircher Eisenwerke, A.-G. Feb. 17, 1936. 4832/37.

PROCESS FOR THE MANUFACTURE OF 3.4-DICYANODIPHENYL.—I. G. Farbenindustrie. Feb. 20, 1936. 4893/37.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—Soc. of Chemical Industry in Basle. Feb. 19, 1936. 5020/37.

METHOD OF SOLIDIFYING HYDROCARBONS and other liquids.—J. M. G. Pouettre. Feb. 19, 1936. 5061/37.

PROCESS OF HIGH VACUUM DISTILLATION.—Eastman Kodak Co. Feb. 21, 1936. 5133/37.

MANUFACTURE OF WATER-SOLUBLE CONDENSATION PRODUCTS.—I. G. Farbenindustrie. Feb. 21, 1936. 5253/37.

APPARATUS FOR ELECTROLYTICALLY DECOMPOSING LIQUIDS under pressure.—H. Olsen. Feb. 20, 1936. 5278/37.

MANUFACTURE OF SOAP-FORMING CARBOXYLIC ACIDS.—Deutsche Hydrierwerke, A.-G. Feb. 20, 1936. 5309/37.

Specifications Accepted with Date of Application

MANUFACTURE OF CELLULOSIC MATERIALS and shaped structures therefrom.—L. Lilienfeld. Nov. 16, 1935. 470,747.

SILICA GELL SUSPENSIONS and compositions.—E. V. Hayes-Gratze. Dec. 4, 1936. 470,699.

TREATMENT OF DRYING OILS, semi-drying oils, corresponding fatty acids, and products derived therefrom.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande, and R. Priester. Dec. 14, 1935. 470,498.

ALCOHOLS and process for making same.—Rohm and Haas Co. Jan. 15, 1935. 470,636.

PROCESS FOR THE MANUFACTURE OF DYESTUFFS of the phthalocyanine series.—I. G. Farbenindustrie. Jan. 9, 1936. 470,499.

ESTERS OF METHACRYLIC ACID and their manufacture.—E. I. du Pont de Nemours and Co., and E. F. Izard. Jan. 14, 1936. 470,503.

MANUFACTURE OF PY-3-OXYTETRAHYDRO-OXYNAPHTHOQUINOLINES. I. G. Farbenindustrie. Feb. 20, 1935. 470,640.

LUBRICANTS AND CUTTING OILS.—Continental Oil Co. Feb. 14, 1935. 470,756.

PROCESS FOR THE MANUFACTURE OF PHTHALOCYANINES.—A. Carpmael (I. G. Farbenindustrie.) Feb. 14, 1936. 470,703.

STABILISATION OF ANIMAL AND VEGETABLE FATS AND OILS.—E. I. du Pont de Nemours and Co. Feb. 15, 1935. 470,573.

MANUFACTURE AND PRODUCTION OF ETHYL CHLORIDE.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 18, 1936. 470,817.

PROCESS FOR IMPROVING LUBRICANTS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. April 27, 1935. 470,580.

MANUFACTURE OF PURIFIED CELLULOSE from cellulose pulps.—British Celanese, Ltd., H. Dreyfus, and S. C. Bate. Feb. 18, 1936. 470,764.

CATALYTIC GAS-IGNITING APPLIANCES.—J. H. G. Horstmann, and Horstmann Gear Co., Ltd. Feb. 20, 1936. 470,647.

PROCESS FOR THE MANUFACTURE OF ESTERS, especially of ethyl acetate.—Usines de Melle. Feb. 27, 1935. 470,773.

TREATMENT OF GASES with adsorbent solids.—Gas Light and Coke Co., S. Pexton, W. K. Hutchison, and F. M. Birks. Feb. 20, 1936. 470,825.

RUBBER COMPOSITIONS.—I. G. Farbenindustrie. Feb. 21, 1935. 470,778.

COLOURING OF LEATHER.—M. Mendoza, G. S. J. White, and Imperial Chemical Industries, Ltd. Feb. 21, 1936. 470,787.

PREPARATION AND PRESERVATION OF VITAMIN-CONTAINING FOODS. Vitabana Soc. Anon. Feb. 21, 1935. 470,508.

PRODUCTION AND USE OF VULCANISATION ACCELERATORS.—Rubber Service Laboratories Co. March 22, 1935. 470,791.

UTILISATION OF CERTAIN WASTE PRODUCTS arising in the manufacture of beet sugar.—E. W. James, and K. Hampel. Feb. 22, 1936. 470,797.

MANUFACTURE OF SOAP.—H. W. Smith and S. G. Campbell. March 14, 1936. 470,715.

MANUFACTURE OF SAPONACEOUS ORGANIC SULPHIDES.—Henkel and Cie, Ges. May 25, 1935. 470,717.

RE-FORMING OF NAPHTHA.—Houdry Process Corporation. April 27, 1935. 470,588.

PROCESS FOR THE MANUFACTURE OF CARBAMIDE and formaldehyde products in presence of sulphonated amide derivatives, and products obtained.—L. Segond, and P. Michaut. June 8, 1935. 470,519.

METHOD OF TREATING PHOSPHATES under conditions of incandescence.—A.-G. der Chemischen Produkten Fabriken Pommerensdorf-Milch, R. Siegler, and F. Hebler. Feb. 24, 1936. 470,591.

COMPOSITION MADE BY COMPRESSING ARTIFICIALLY-PRODUCED RESINS.—Kohle- Und Eisenforschung Ges. July 4, 1935. 470,664.

SENSITISING PHOTOGRAPHIC GELATINO-SILVER-HALIDE EMULSIONS and manufacture of dyes therefor.—Kodak, Ltd. (Eastman Kodak Co.). Nov. 15, 1935. 470,725.

SENSITISING PHOTOGRAPHIC SILVER-SALT EMULSIONS and manufacture of dyes therefor.—Kodak, Ltd. (Eastman Kodak Co.). Nov. 15, 1935. 470,726.

MANUFACTURE OF VAT DYESTUFFS.—I. G. Farbenindustrie. July 17, 1935. 470,529.

PREPARATION OF IRON-TANNED LEATHER.—I. G. Farbenindustrie. July 24, 1935. 470,530.

MANUFACTURE OF VAT DYESTUFFS.—I. G. Farbenindustrie. July 27, 1935. 470,531.

PROCESS FOR PRODUCING LUBRICATING-OILS.—Ruhrchemie, A.-G. Aug. 24, 1935. 470,534.

EXTRACTION OF HEAVY METALS from phosphatic ores, slags, and like materials containing them.—I. G. Farbenindustrie. Dec. 5, 1935. 470,540.

MANUFACTURE OF PIGMENT DYESTUFFS of the phthalocyanine series.—I. G. Farbenindustrie. Oct. 23, 1935. 470,542.

NITRO DERIVATIVE OF TERTIARY-BUTYL PSEUDO CUMENE and process for preparing same.—L. Givaudan and Cie Soc. Anon. Dec. 23, 1935. 470,550.

PROCESS FOR REGENERATING WASTE SULPHURIC ACID.—Cellulose Patents (International), Ltd. Jan. 14, 1936. 470,556.

DRYING PROCESS.—Dr. A. Wacker Ges. Fur Elektro-Chemische Industrie Ges. Jan. 20, 1936. 470,558.

Chemical and Allied Stocks and Shares

GENERAL conditions in the industrial and other sections of the Stock Exchange have shown little change this week, but various shares of companies connected with the chemical and kindred trades were moderately higher.

Imperial Chemical reacted further at one time, but improved later, and at 37s. 10½d. are unchanged on the week. The market continues to await the interim dividend decision with a good deal of interest, as it is being suggested in some quarters this may be raised from 2½ per cent. to 3 per cent., the rate which ruled some years ago. If this increase were forthcoming it would not necessarily imply a higher total for the year, as it might be made in order to bring the interim more in relation to the final dividend. The total for 1936 was 8 per cent., but over 12 per cent. was then earned on the ordinary capital.

Boots Pure Drug have been in demand, and at 53s. are 6d. higher on the week. There is a disposition at the moment to give more attention to the shares of large companies on the view that the latter may not be affected to nearly the same extent by higher prices of materials as smaller concerns. United Molasses improved moderately to 31s. 6d. aided by favourable market views of dividend prospects, reference to which was made last week. Borax Consolidated at 32s. are somewhat lower, but have remained active on anticipations of a larger dividend. The market is, however, less hopeful of a resumption of interim dividend payments, it being pointed out that the directors invariably follow a conservative policy.

Associated Portland Cement and British Plaster Board were lower, due largely to the fact that shares of companies connected with the building and allied trades are out of favour owing to fears that the slowing down of activity in house building may continue. Nevertheless it is generally believed Associated Cement will be able to maintain its dividend, and similar remarks apply in the case of British Plaster Board.

Staveley were steady under the influence of the recent dividend announcement, which was in excess of general expectations. Various other iron, steel and allied shares were moderately better in price, including Stewarts and Lloyds and Tube Investments. There are hopes that the latter company may bring its dividend up to 20 per cent. Dorman Long reacted but were steadier later. The ordinary shares of the latter company represent only a small proportion of the total capital, and earnings on them may therefore be at a high level in a good year. Some market men place the latter at around 30 per cent. for the current year, but no very large increase in dividend is being anticipated as the directors are likely to place a large sum to reserves, etc.

Triplex Glass were 2s. lower at 66s., awaiting the meeting, but United Glass Bottle have improved 6d. to around 54s. on the higher interim dividend which has aroused hopes that the total for the year may be raised from 11 per cent. to 12 per cent., or 12½ per cent. It may be recalled that earlier in the year the company acquired bottle making interests of the Distillers Co.

Pinchin Johnson were steady at 42s. 6d. on the maintenance of the interim dividend at 7½ per cent. on the larger capital arising from the share bonus distributed earlier in the year. International Paint and Indestructible Paint were unchanged, awaiting their interim dividend announcements.

Unilever were little changed on the week at 42s. 9d., and Lever's preference also have the same prices as a week ago. General Refractories have been reactionary and are down to 27s. despite the increase in the interim dividend announced recently, there having been a certain amount of profit-taking reported.

Monsanto Chemicals preference were around 23s. British Glues, Fison Packard and Prentice, and Cooper McDougall and Robertson, were steady but unchanged. Burt, Boulton and Haywood kept around 22s. awaiting the results.

"Shell," Anglo-Iranian and other leading oil shares were reactionary owing to selling from the Continent.

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